OCTOBER 15, 1961

AUTOMOTIVE INDUSTRIES

ENGINEERING · MANAGEMENT · PRODUCTION · DESIGN

A CHILTON PUBLICATION

'62 CARS IN FULL COLOR

A NEW TOOL-SETTING METHOD

Tool-Tronic Gage locates tool tip within .000025 by fast, simple electronic-optical method

by Alden H. Jacobson, Chief Engineer
Bore-Matic Division
The Heald Machine Company

With today's trend to greater accuracy and precision in single-point Borizing, the problem of precise tool-tip location becomes increasingly important.

Previous methods, while of high accuracy, are relatively slow and require considerable skill on the part of the operator. The optical method, using a precision-calibrated microscope, is dependent on the relative degree of operator eye fatigue. If eyestrain is a result, such an undesirable condition is known as "eyeballing." And the touch method, using dial indicators, often causes microscopic damage to the cutting edge with resulting impairment of the finished surface.

Here at Heald we have devoted a great deal of research to devise a method of tool-setting which would maintain the highest accuracy, prevent tool tip damage, and require no special operator skill.

The result is the new Tool-Tronic Gage illustrated here. Tool tip location is precisely determined by optical means, with electronic amplification giving highly accurate readings on two large meter scales.

The unit consists essentially of a sensing head which contains the light source, optics and photo cells, and a separately mounted amplifier and meter case. The sensing head is mounted vertically on the machine near the workhead, where the tool can be positioned into gage opening. As the tool is moved into place by operation of the table and cross slide, it interrupts the light rays and the amount of light passing on each side of the tool is compared to reference photocells and read out on two large horizontal-scale meters. To locate the tool with an accuracy of 25 millionths, it is only necessary to move tool in X and Y directions until the pointers on both meters are centered on the "zero" mark. For the operator to determine this precise position and return to it whenever desired requires no more skill or experience than that needed to operate the machine.

The Tool-Tronic Gage can be used with most types of single-point boring and turning machines. It should prove especially valuable on numerically-controlled contour Borizing equipment where extreme precision is required.

Tool-Tronic Gage, showing meter case, sensing head and cable.

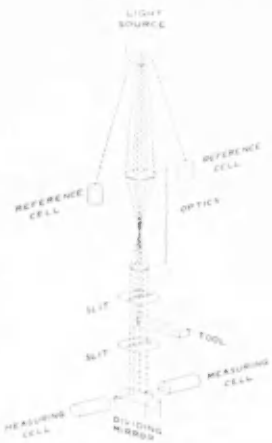

Diagram showing principle of operation of Tool-Tronic sensing head.

Tool-Tronic gage in use on a numerically-controlled Heald Model "S" Bore-Matic. Sensing head (arrow) receives tool and centering indication is read on meters at right.

Your Heald engineer will be glad to arrange a demonstration of this new tool setting gage for you, in your plant or ours.

It Pays to come to Heald

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Subsidiary of The Cincinnati Milling Machine Co

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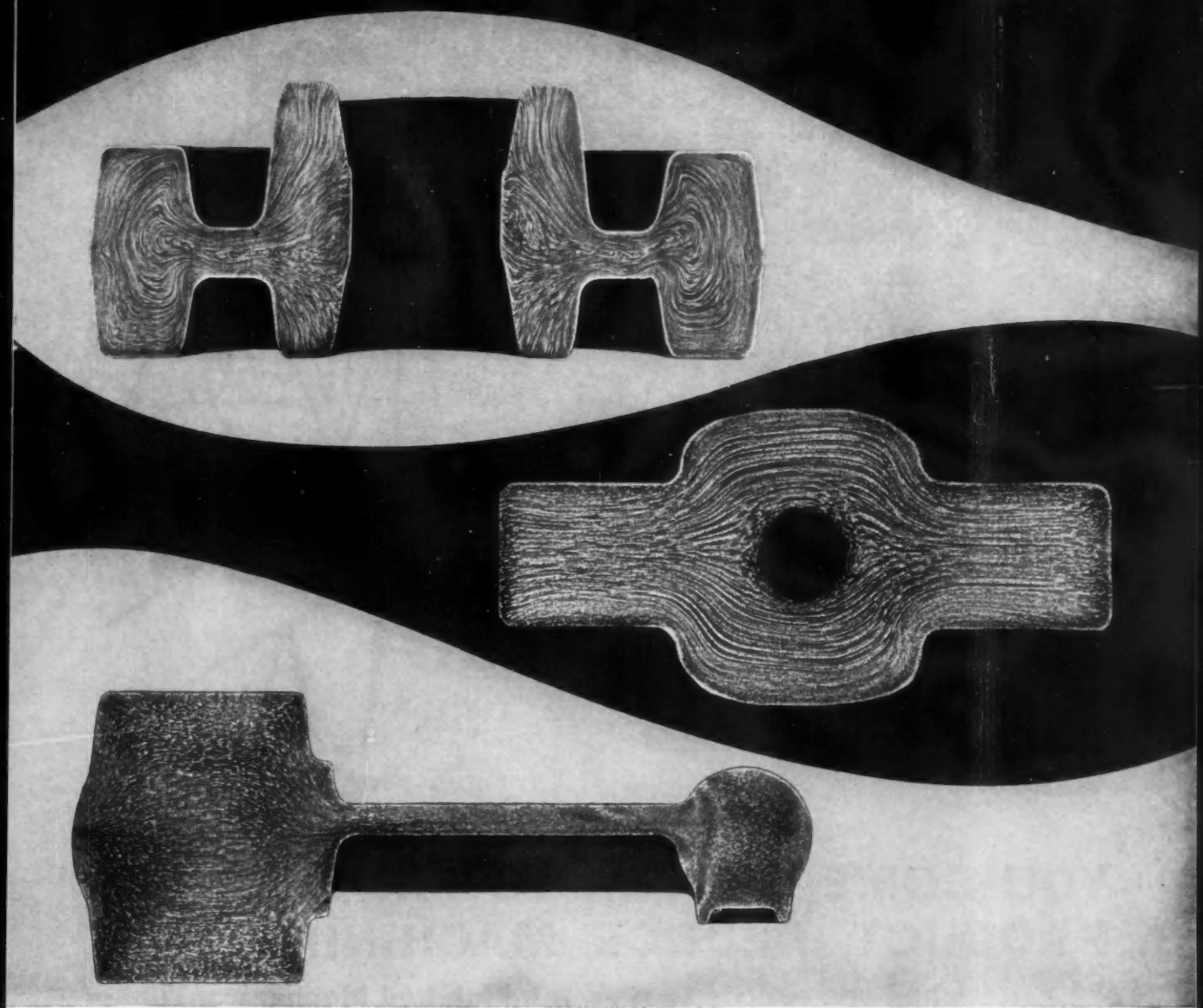

Only FORGED *parts have flow lines like these*

When quality steel forgings are cut in half, polished, etched, and dyed, you can see one reason for their great strength. The grain structure shows how the forging process has "worked" added strength into the steel. Note how the grain follows the contour of the forgings, placing the greatest strength where it is most needed.

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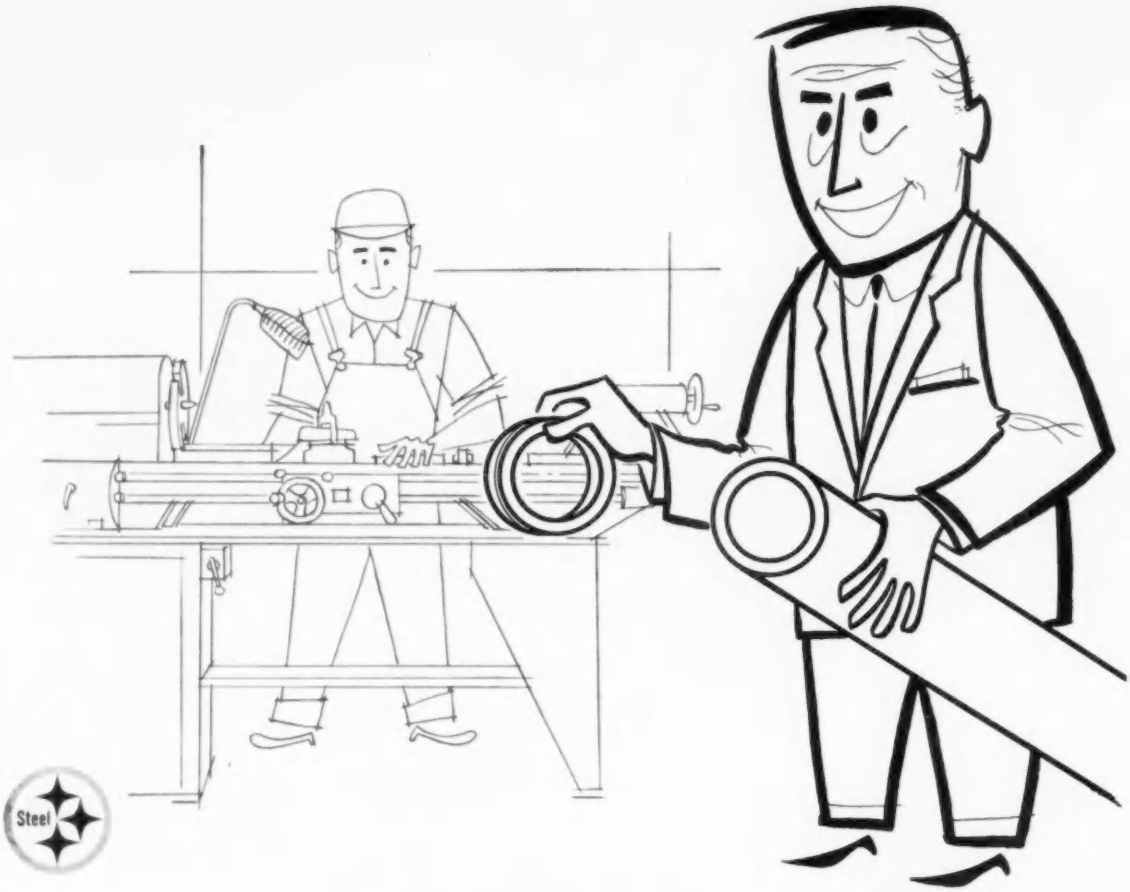

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AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE • PUBLISHED SEMI-MONTHLY

OCTOBER 15, 1961

Passenger Cars • Trucks • Buses • Aircraft • Tractors • Engines • Bodies • Trailers • Road Machinery • Farm Machinery • Parts and Components • Accessories • Production and Processing Equipment • Design • Production • Engineering • Management

VOL. 125 No. 8

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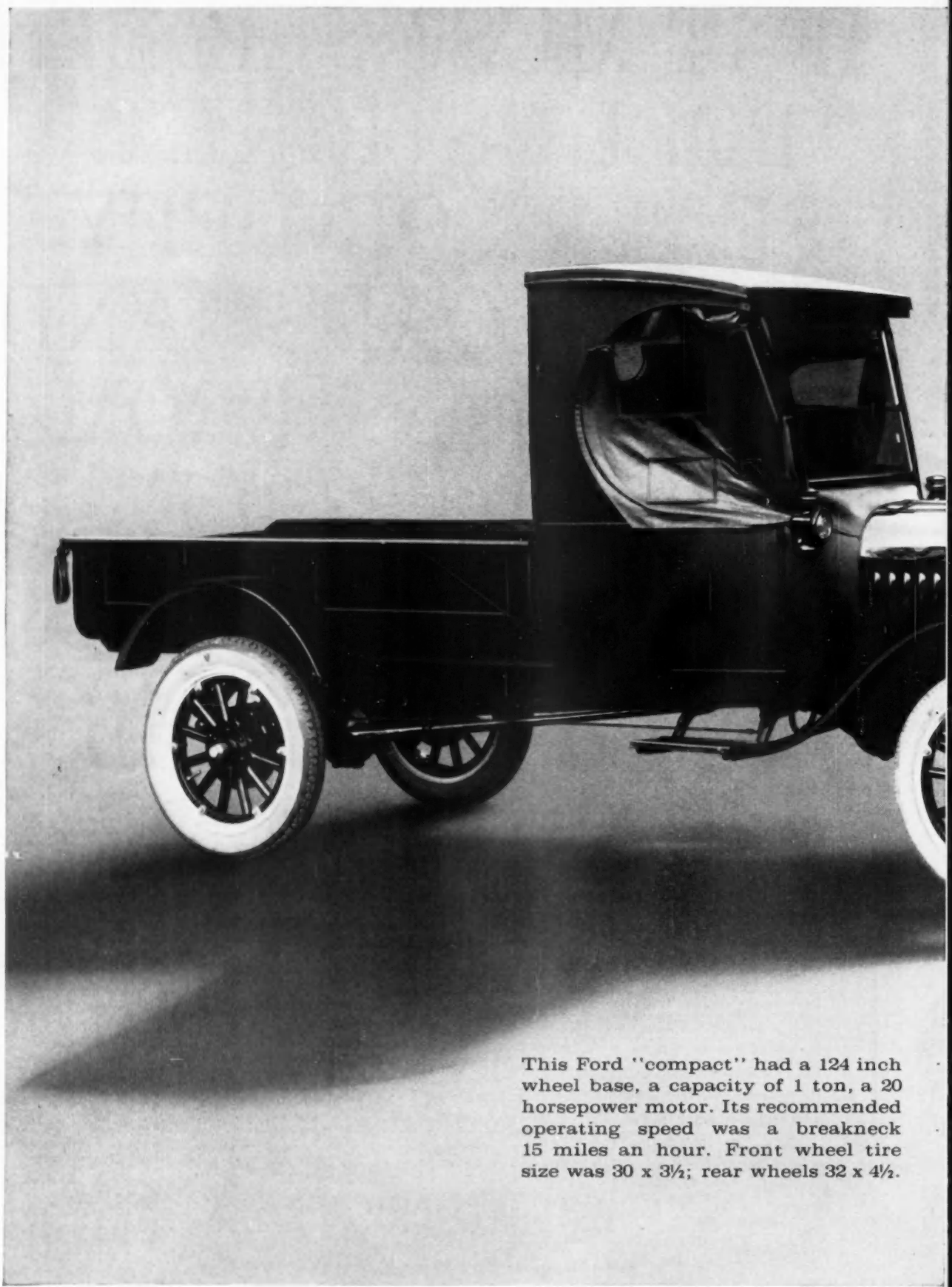
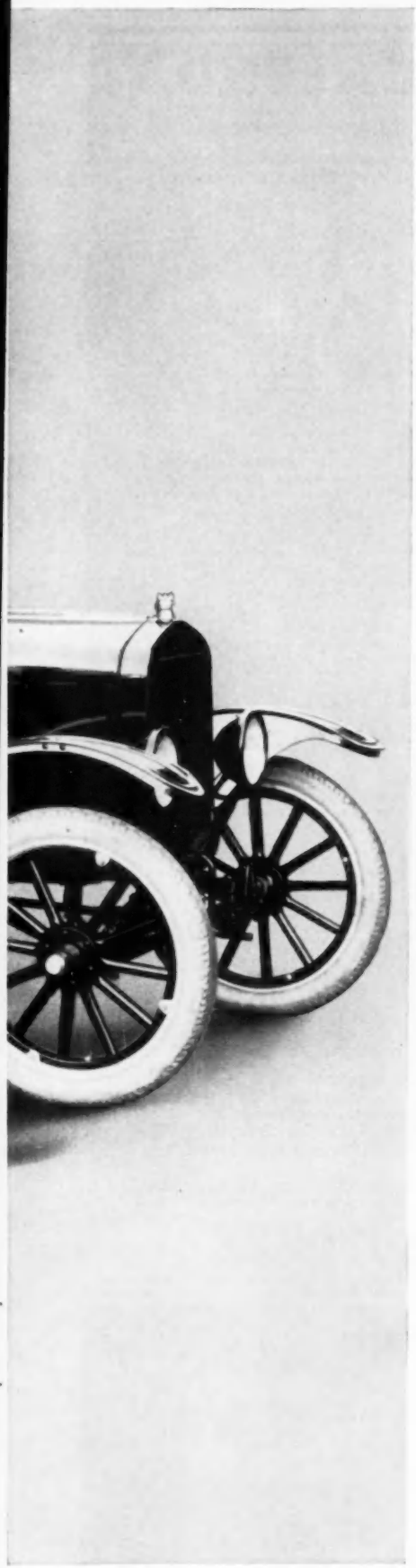


This Ford "compact" had a 124 inch wheel base, a capacity of 1 ton, a 20 horsepower motor. Its recommended operating speed was a breakneck 15 miles an hour. Front wheel tire size was 30 x 3½; rear wheels 32 x 4½.



What's so new about the "compact" truck?

As far back as 1924, Budd was supplying the first all-steel bodies for this kind of "compact-sized" truck and had already introduced the first steel disc wheel—just two of many pioneering Budd contributions to the automotive industry.

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Budd Automotive

DETROIT 15

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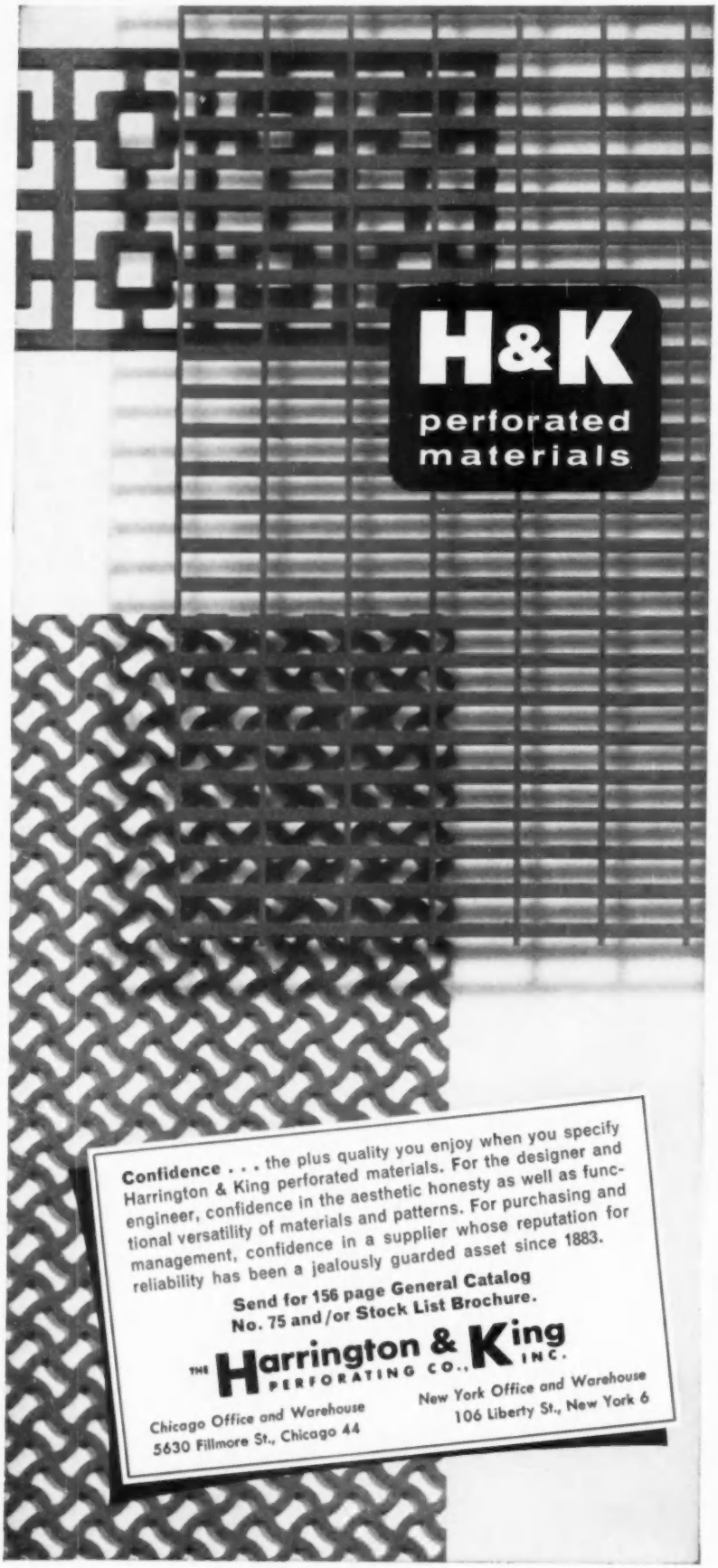
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CALENDAR

OF COMING SHOWS AND MEETINGS

American Society of Body Engineers, 16th Annual Technical Convention, Detroit ..... Oct. 18-20

16th Midwest Conference of the American Society of Quality Control, St. Louis ..... Oct. 19-20

American Foundrymen's Society, Michigan Regional Foundry Conference, Michigan State U., Michigan ..... Oct. 19-20

1961 National Conference on Industrial Hydraulics, "Versatility and Reliability of Fluid Power," Chicago ..... Oct. 19-20

American Society for Metals, 43rd National Congress and Exposition, Detroit ..... Oct. 23-27

Society for Nondestructive Testing, 21st National Convention, Detroit Oct. 23-27

1961 Computer Applications Symposium, Sponsored by the Armour Research Foundation, Chicago Oct. 25-26

National Management Association, 1961 Annual Convention, Chicago Oct. 25-27

American Society of Tooling and Manufacturing Engineers, Semi-Annual Engineering Conference, Toronto, Ont. ..... Oct. 26-27

Metal Treating Institute, Annual Fall Meeting, Detroit ..... Oct. 26-28

The Material Handling Institute, Joint Industry Annual Meeting, White Sulphur Springs, W. Va. Oct. 29-31

American Gear Manufacturers Association, Semi-Annual Meeting, Chicago ..... Oct. 29-Nov. 1

National Metal Trades Association, 62nd Annual Convention, New York ..... Oct. 29-Nov. 1

Industrial Management Society, Industrial Engineering and Management Clinic ..... Nov. 1-3

Malleable Founders Society, 12th Annual Meeting Development Conference, Cleveland ..... Nov. 1-3

Society of Automotive Engineers, Fuels and Lubricants Meeting, Houston ..... Nov. 9-13

American Society of Mechanical Engineers, 1961 Annual Meeting, New York City ..... Nov. 26-Dec. 1

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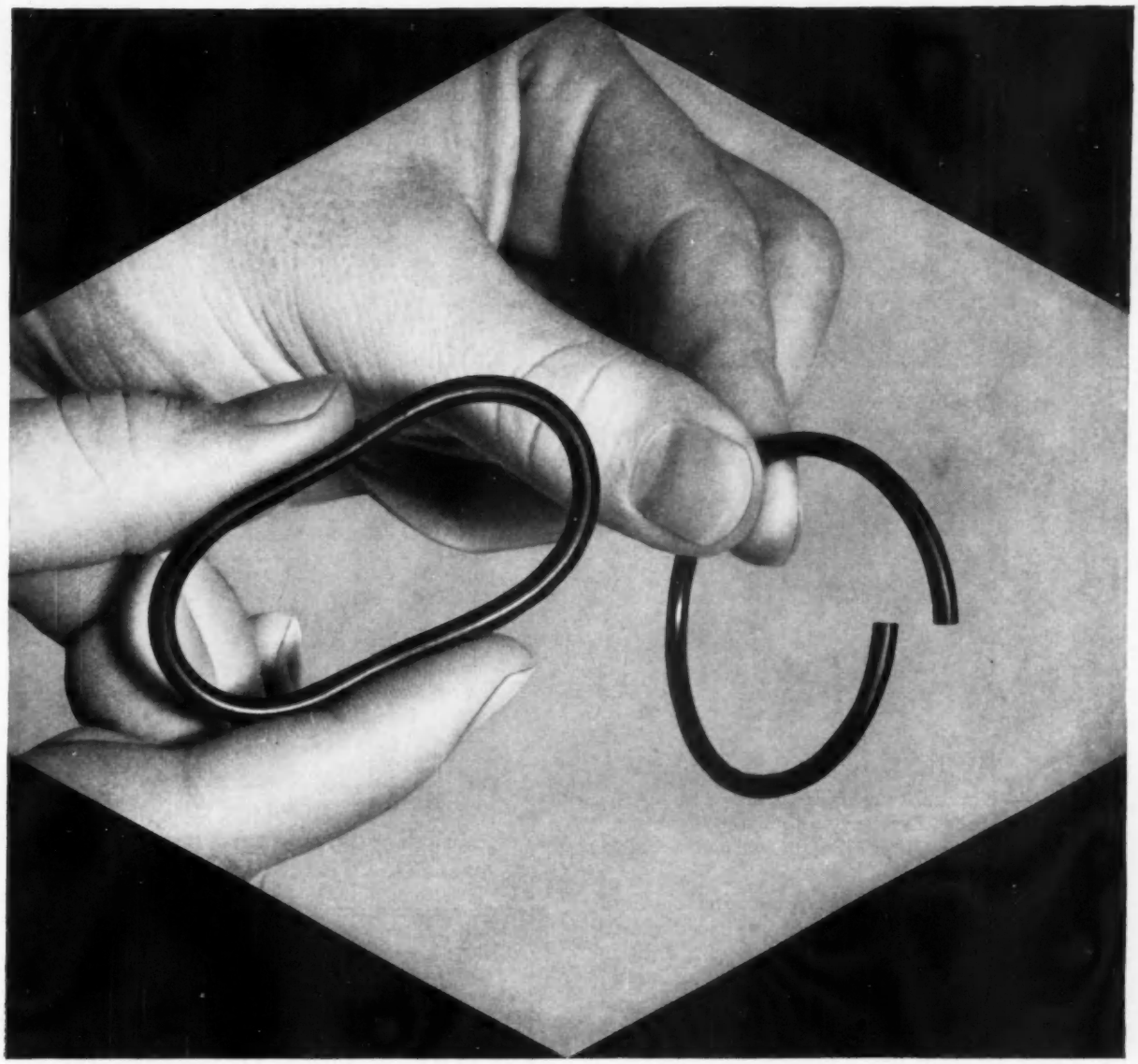

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COMPARISON

Properties	ASTM	Oleform	Acetal	Nylon 66	Wood Flour Filled Phenolic
Mechanical[a]					
Tensile Yield Strength[b], 10^3 psi	D638	4.5	9.8	8.5-9	7.5
Elongation at Yield[b], %	D638	6	10	60	1
Tensile Modulus[c], 10^5 psi	D638	2.9	3.75	1.75	10
Flexural Modulus[d], 10^5 psi	D790	5.5	4.1	1.75	10
Izod Impact Strength, ft-lb/in notch	D256	0.9	1.4	2.0	0.3
Physical					
Specific Gravity	D792	1.24	1.43	1.14	1.45
Heat Distortion Temp., °F	D648				
at 66 psi		295	338	360-390	300
at 264 psi		205	212	150-170	275
Water absorption (24 hr.) %	D570	0.02	0.12	1.5	0.6
Lin. Coef. of Ther. Exp., 10-5 in/in/°C	D696	3.8	8.1	10	3.8
Chemical Resistance					
Acids		Excellent	Attacked	Attacked	Good
Bases		Excellent	Attacked	Excellent	Attacked
Solvents		Good	Excellent	Good	Good
COST					
Cents/lb		36	65	98	22
Cents/cu in		1.5	3.3	4.0	1.2

[a] Injection molded specimens at room temperature
[b] Crosshead speed 1/min
[c] Crosshead speed 0.2/min
[d] Crosshead speed 0.05/min

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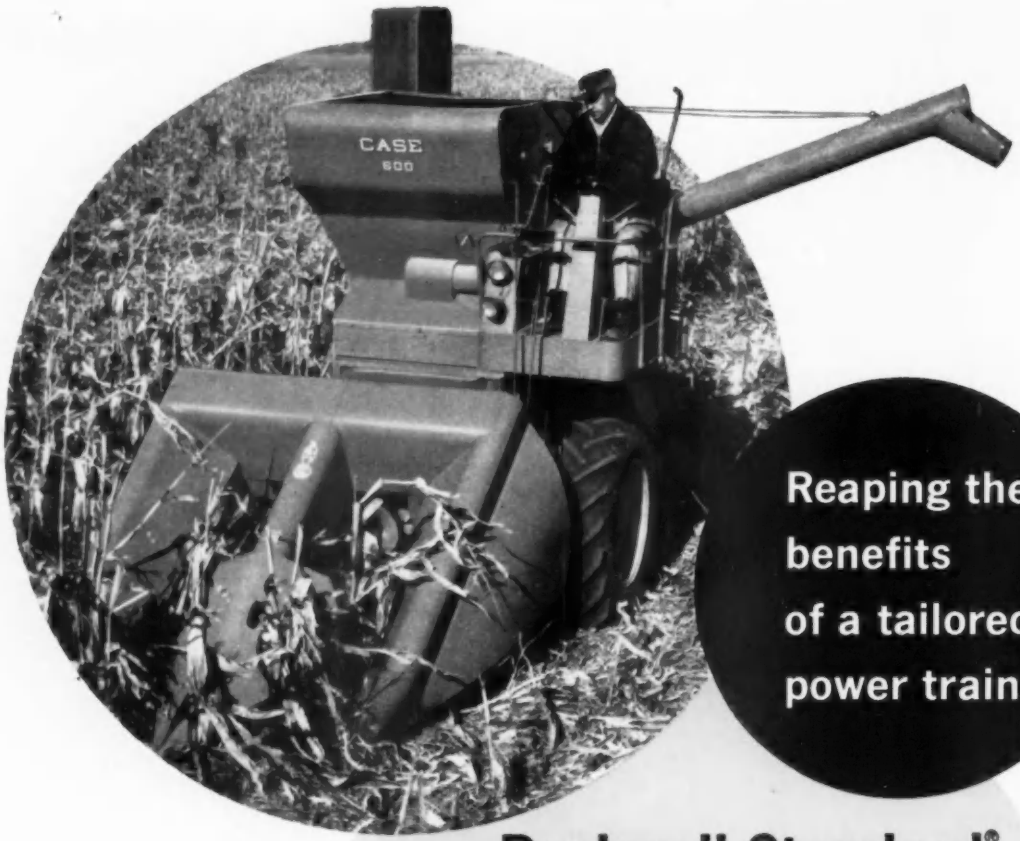

Reaping the benefits of a tailored power train

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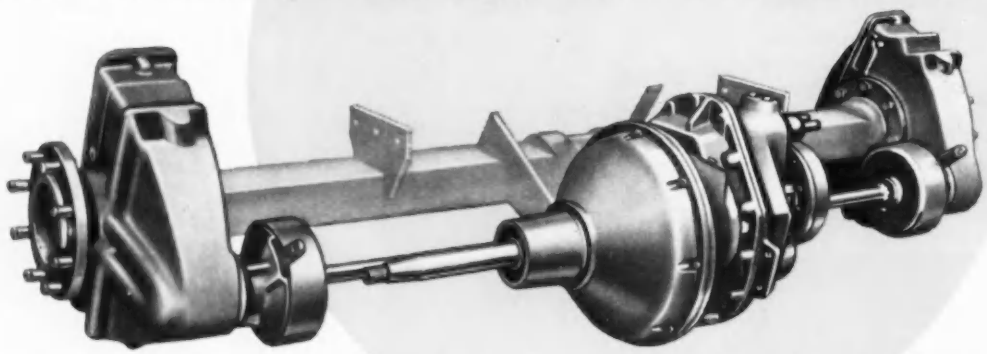
Custom Drive Helps New Case "600" Combine Do Its Chores!



J. I. Case Company engineers designed the new "600" Combine with three significant advantages—big capacity, extra maneuverability and unexcelled versatility! More than ever, here is a combine engineered and built to do a remarkable job of meeting the needs of all crops and harvesting conditions.

To make sure this equipment does all its jobs well, a custom-made drive was needed. And because of their proven performance on other J. I. Case vehicle needs, Rockwell-Standard engineers were called in to work with Case planners and designers. Result of this cooperative effort was the new Rockwell-Standard TA-251 Axle. In every test to date, this specially designed driving axle has proven that it will give long, efficient, productive service—and take all the rugged usage for which the Case "600" was built.

Rockwell-Standard is the acknowledged leader in developing axles for all types of specialized vehicles. Whatever problems you have in designing and building self-propelled drives, consult Rockwell-Standard. Their specialized experience is industry-wide. It costs you nothing—and will undoubtedly offer you substantial savings in both time and money.

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Transmission and Axle Division, Detroit 32, Michigan

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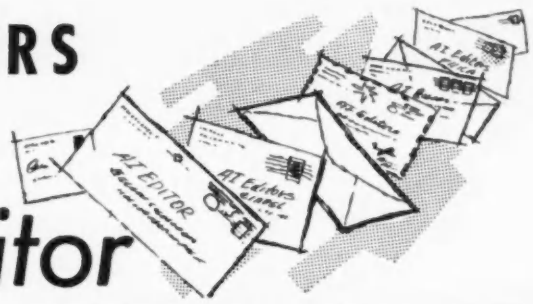
LETTERS to the Editor



Readers' opinions or requests for additional information on material appearing in the editorial pages of AUTOMOTIVE INDUSTRIES are invited for this column. No unsigned letters will be considered, but names will be withheld on request. Address *Letters to the Editor*, AUTOMOTIVE INDUSTRIES, 56th & Chestnut Sts., Philadelphia 39, Pa.

IMPACT

Thank you very much for your letter advising me that you did no longer have the information on the article entitled, "Combination Sparkplug and Pressure Pickup." However, your kindness in publishing my letter has resulted in a great fund of information from engineers and companies throughout the country. We now have so much material that we will have to spend a while digging through it, but it all seems to boil down to the fact that Kistler Instrument Corp. makes the type which we need.

Truthfully, I was quite surprised that busy engineers across the country would take the time to supply the very complete and comprehensive data they have in response to a request such as ours. This, of course, was all made available to us by your kindness in publishing our letter. Thank you many times again.

C. F. Whitehill
Dept. of Mechanical Engineering
Montana State College
Bozeman, Mont.

METRIC SYSTEM

The issue of September 15, under "Washington Wire," reference was made to the bill pending in Congress to investigate the practicability of changing to the metric system. Having had considerable experience with both metric and inch systems, I have always found that the factor preventing a change is the non-interchangeability of inch and metric screw threads. This is a serious point generally overlooked by advocates of the change.

We have open to us a very simple expedient that would give us a complete decimal system without complicating matters by changing screw threads. This is the method of merely extending our decimalization of our present system.

We already use mills for thousandths of an inch and microinches for millionths of an inch. If we extend this upwards by calling 10 inches a "short foot," 100 inches a "long yard" and 100,000 inches a "long mile," we will have the advantage of a complete decimal system for length. The same idea could be applied to cubic measurements. As to liquid measures, we do not need any, for cubic measure can be applied to measure liquids. Indeed, the metric advocates themselves, seem to be using cubic centimeters instead of liters —thus eliminating the complication resulting from the error that crept into the relationship of cubic and liquid measures when the metric system was originated.

In the matter of weights, civil engineers already use "kips" for thousands of pounds, and some manufacturers are using decimals of a pound instead of ounces to measure weights. All that is needed here is to create names for the small units.

Archibald Black
Engineer
Stafford Springs, Conn.

SINTERED-IRON

We are interested in receiving a copy of the article "Sintered-Iron Brake Lining" by Joseph Geschelin, which appeared in the August 15 issue of AUTOMOTIVE INDUSTRIES.

M. J. Magnus
Office of Graham Parker
Industrial & Technical Consultants
New York, N. Y.

STANDARDIZE 100% ON SOUTHERN FASTENERS

Southern SPECIALIZES in

Standard Fasteners for METAL

When you specify Southern fasteners, you are adding quality to your products and speed to your assembly operations. Southern Screw is a specialist in plated or plain USA-made standard fasteners for the metal industry. This means dependable quality and reliable service with every order. Buying from Southern also means that your "specials" may be a standard stock item in Southern's 1,500,000,000-piece supply at the Statesville, North Carolina plant.

Write for and examine Southern Screw's current Stock List. Then see what 15-year specialization in making quality fasteners can mean to you. Address: Southern Screw Company, P.O. Box 1360, Statesville, North Carolina.

Manufacturing and Main Stock in Statesville, North Carolina

WAREHOUSES:
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Types 1, 23 & 25 Thread Cutting Screws

Machine Screws & Nuts • Tapping Screws
Stove Bolts • Drive Screws • Carriage Bolts
Continuous Threaded Studs • Hanger Bolts
Dowel Screws

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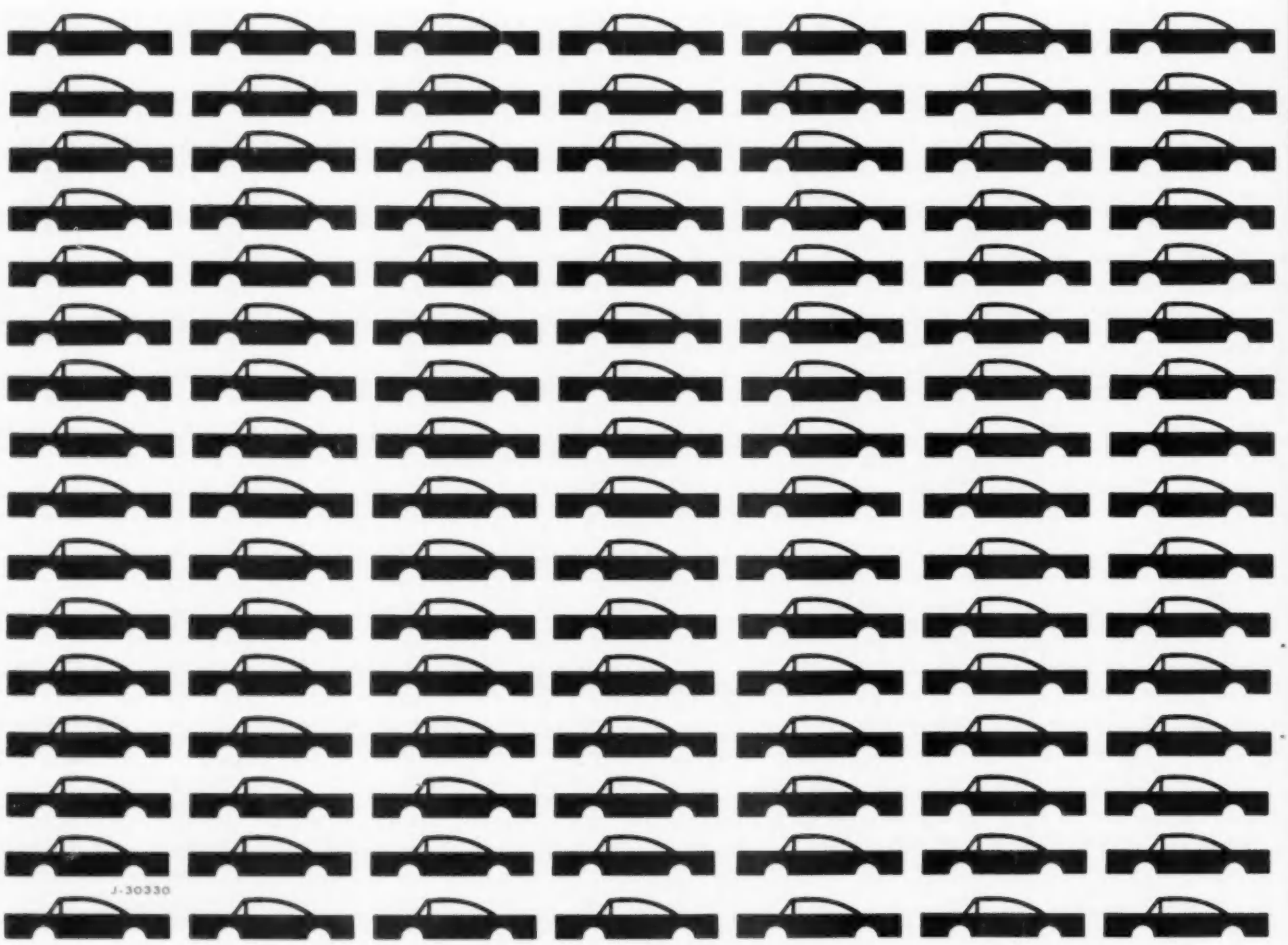
The Westinghouse BF Relay is helping the automotive industry solve its floor space problem. One automotive customer was able to reduce the length of a single control panel from 36 feet to 22 feet. Another eliminated one of three panels. The Westinghouse BF Relay is a new concept in relay design tailored to space-saving needs of automation. As many as four BF Relays fit in the space of

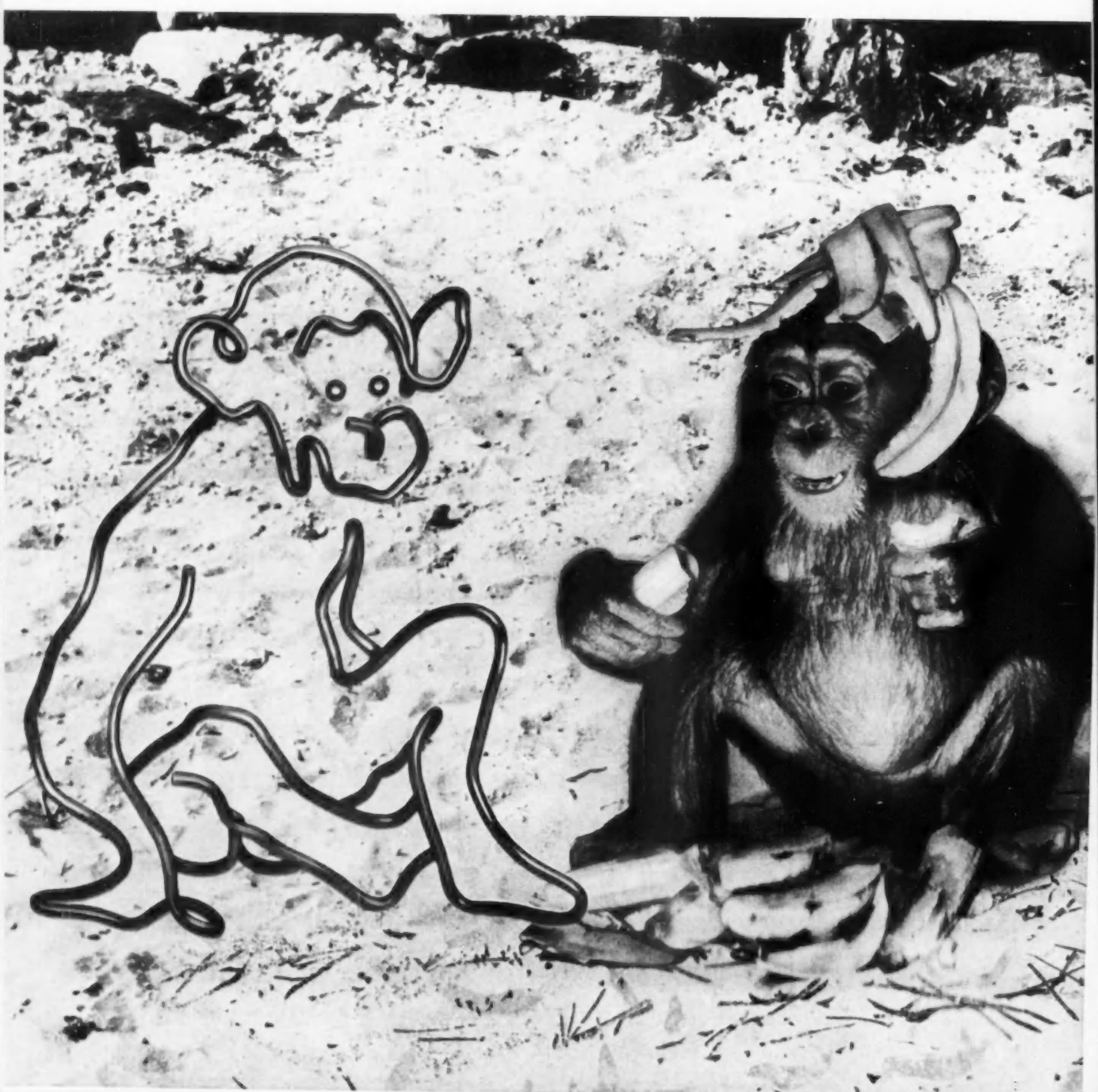


one old style relay. Besides being small, performance excels other machine tool relays. Learn how it can help you gain valuable floor space for more productive uses. Contact your Westinghouse sales engineer or write: Westinghouse Electric Corporation, Standard Control Division, Beaver, Pennsylvania. *You can be sure . . . if it's* **Westinghouse**

Automotive industry saving thousands of dollars in floor space with the new Westinghouse BF Relay

Westinghouse BF Relays control six transfer lines built for the automotive industry by F. Joseph Lamb Co., Detroit.

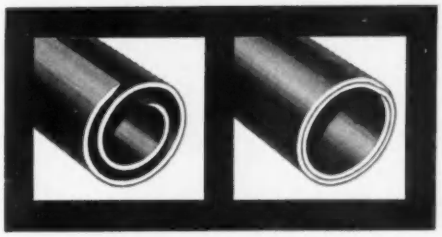
Bundy can mass-fabricate practically anything



Bananas? Hardly. Chimpanzees? Just this once. Automotive parts? Our specialty. Just tell us what you want and the quantities. We'll put our engineers and designers to work. What you'll get is a low-cost, mass-fabricated component in exactly the shape you ordered—by the thousands . . . or millions. Bundyweld® steel tubing—in sizes up to 5/8" O.D.—meets Govt. Spec. MIL-T-3520, Type III; ASTM 254; and SAE specifications. So, for the finest in steel tubing, bent to your exact specifications, at lower cost, and delivered on time, call, wire, or write: Bundy Tubing Co., Detroit 14, Mich.

BUNDY TUBING COMPANY • DETROIT 14, MICH. • WINCHESTER, KY. • HOMETOWN, PA.

World's largest producer of small-diameter tubing. Affiliated plants in Australia, Brazil, England, France, Germany, Italy, Japan.



Bundyweld, double-walled from a single copper-plated steel strip, is metallurgically bonded through 360° of wall contact. It is lightweight and easily fabricated . . . has remarkably high bursting and fatigue strengths. Sizes available up to 5/8" O.D.

No matter what type of mass-fabrication you require, Bundyweld may be your answer. Shown here are just a few tubing operations fabricated by Bundy.

BUNDYWELD® TUBING

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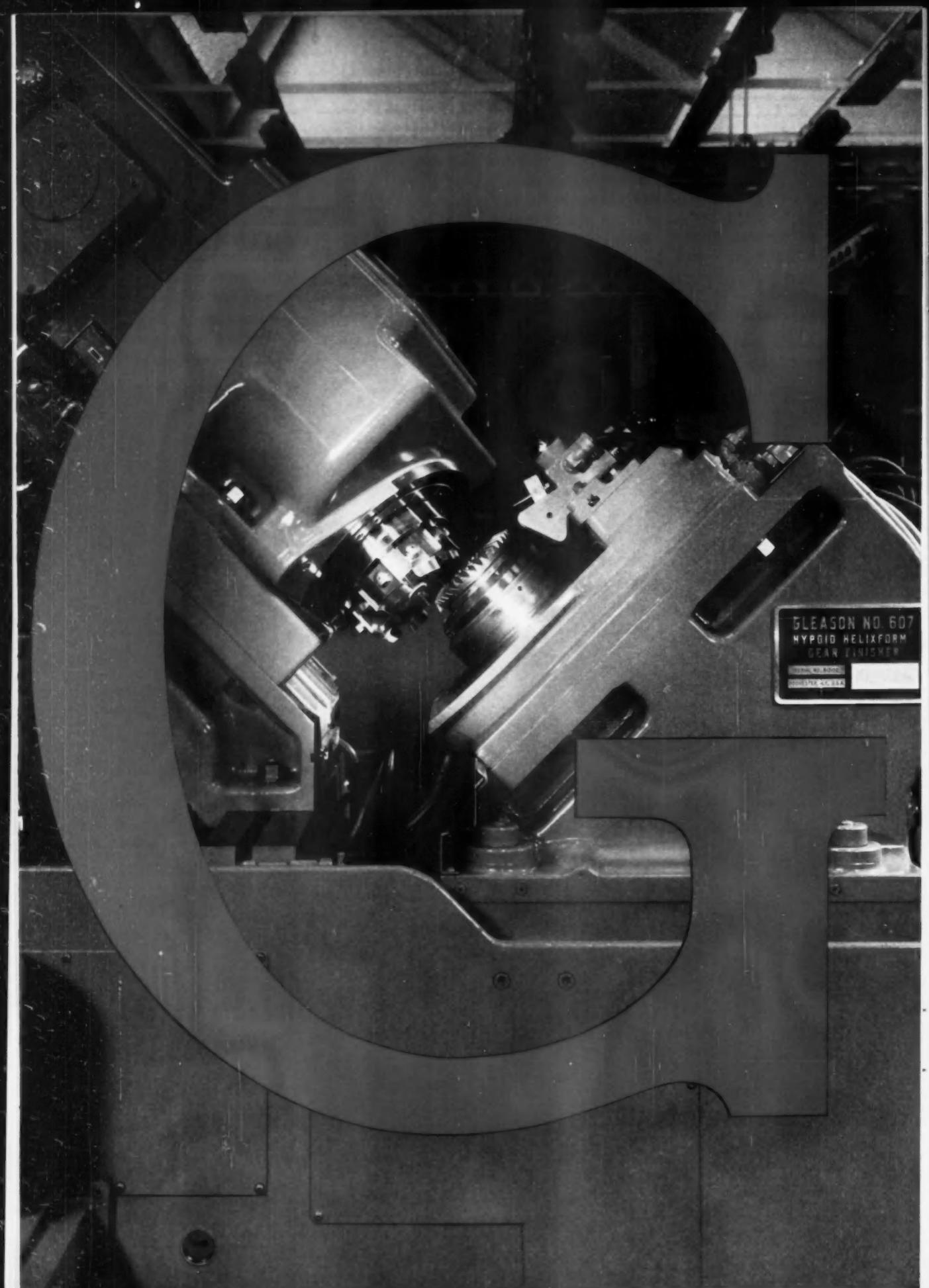
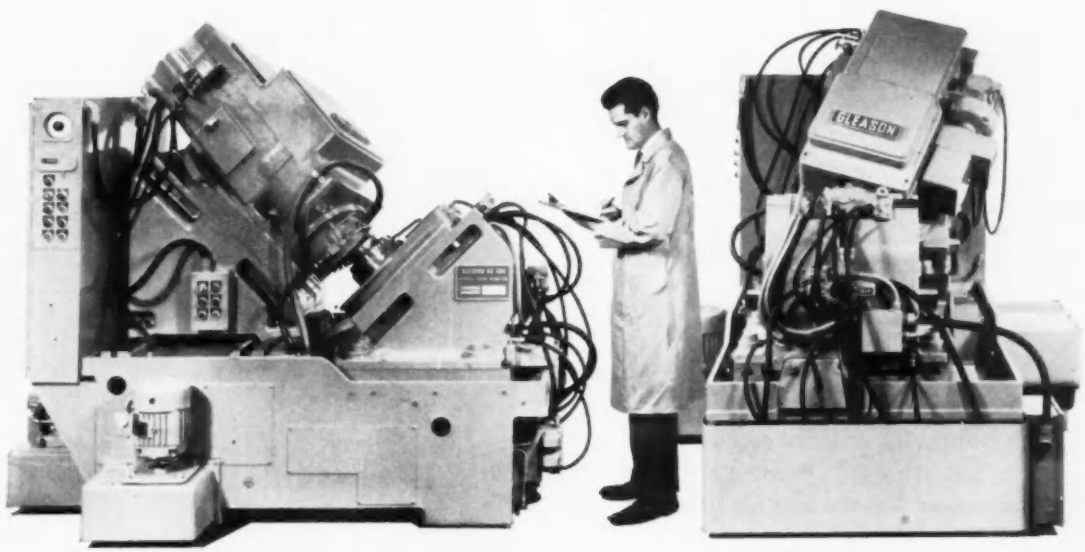

GLEASON NO. 607
HYPOID HELIXFORM
GEAR FINISHER

...PRODUCES QUIET, ACCURATE GEARS, UP TO 50% FASTER...AND SAVES FLOOR SPACE. These new Gleason "inclined-spindle" Hypoid Gear Cutting machines are primarily designed for faster, more accurate roughing and finishing of automotive main drive gears up to 10½" O.D. ■ Unique "inclined-spindle" design provides greater rigidity for precision cutting. ■ New type cutters, faster index and work clamp arrangements combine with automatic loaders to increase production up to 50%. ■ Yet, these new machines occupy 35% less floor space than previous machines. ■ Set-up and operation are simplified . . . only four summary settings with simple gage bars to relate work and cutter. Any number of machines can be set-up with the same gage bars to produce identical gears . . . no expensive set-up fixtures needed. ■ New magnetic chip removal and coolant systems assure constant forced flow of clean oil over the work . . . help prolong cutter life, eliminate periodic cleaning, and minimize coolant loss. ■ For information on these all-new machines write Gleason Works, 1000 University Avenue, Rochester 3, New York.

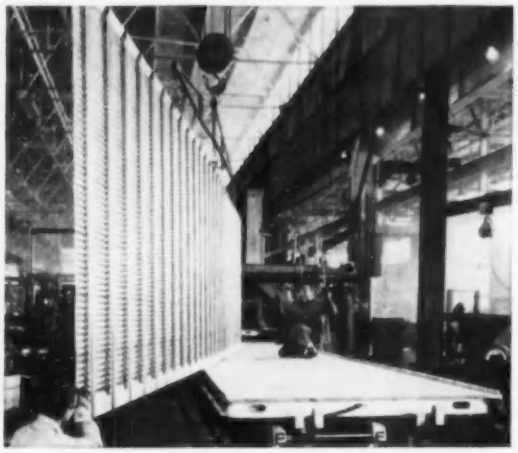
A BRAND NEW ANGLE IN GEAR CUTTING . . .



NEW GLEASON No. 606 Hypoid Gear Rougher

NEW GLEASON No. 607 Hypoid Helixform Gear Finisher

GLEASON



Dollar savings provided by building Volume☆ Vans with (USS) Cor-Ten High Strength Steel

Fruehauf Trailer Company works some design magic with USS COR-TEN Brand Steel that results in substantial construction savings.

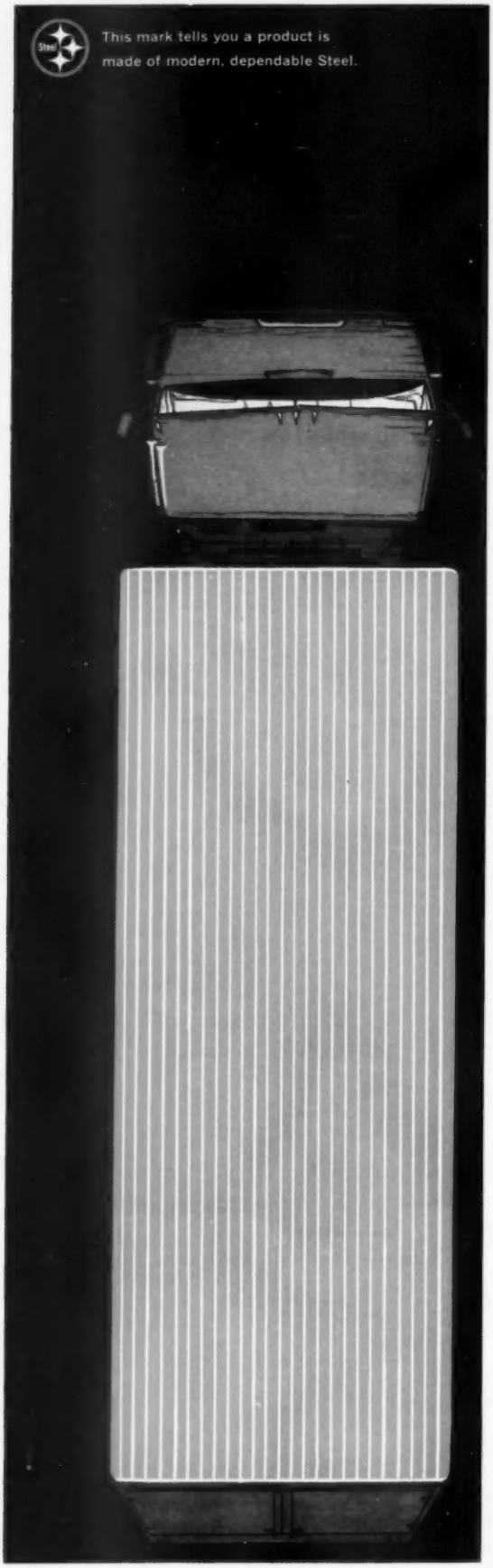
In their stressed-skin trailers, called "Hi-Tensile Volume☆ Vans," USS COR-TEN High-Strength Low-Alloy Steel is used for the side and roof panels, angles and rub rails. Welding this steel instead of riveting contributes to lower cost, also makes the Hi-Ten Volume☆ Van strong and sturdy.

Increased strength and rigidity also are obtained by cold forming COR-TEN Steel side and roof panels with ¼" deep rectangular corrugations. Angles and rub rails are of USS COR-TEN High Strength Steel and together with the side and roof panels, add up to a total of only 2,500 pounds in each trailer. COR-TEN Steel also has improved atmospheric corrosion resistance and, as an added bonus, paint lasts much longer on COR-TEN Steel.

In transportation equipment USS COR-TEN Steel is noted for its long service life, low first cost and economical operation. Get the real facts on USS COR-TEN Steel from United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania USS and COR-TEN are registered trademarks.

United States Steel Corporation · Columbia-Geneva Steel Division · National Tube Division · Tennessee Coal and Iron Division · United States Steel Supply Division · United States Steel Export Company

(USS) United States Steel



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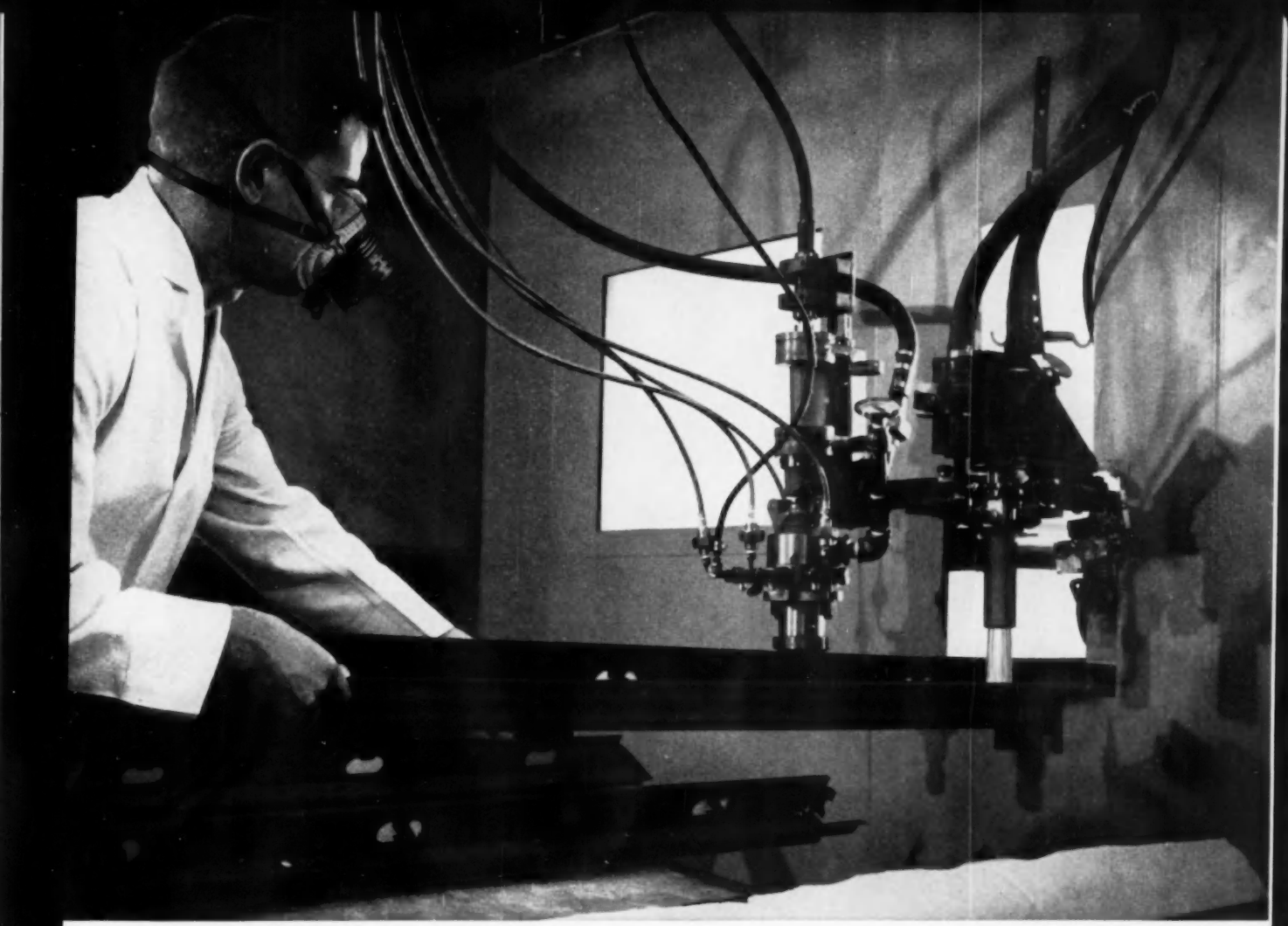


FOAMED-IN-PLACE, RIGID URETHANE

. . . one product answers five automotive needs

Voracel® foamed-in-place rigid urethane can show definite economic advantages over cut-and-paste batt applications. These advantages are: *insulation, structural support, sound deadening, "pocket sealing," and surface protection.* Application of Voracel can be accomplished by either a spray or pour operation.

Voracel is the Dow trademark for the rigid urethane foam resulting from the interaction of Voranol® urethane polyethers and Voranate® isocyanate adducts.

Although new on the automotive scene, Voracel shows excellent results in strengthening sheet metal, especially when it is foamed in place between two sheets. Exceptional ease of application, good adherence to metal, and high resistance to alkali, gasoline, and other common automotive materials indicate its use as lining for hoods and other sheet-metal areas. Voracel can be used to inhibit corrosion in enclosed areas such as rocker panels. For information, call or write to the Dow sales office nearest you.

ENGINE COOLING Ebullient cooling for passenger cars is under intensive research at Dow's Automotive Chemicals Laboratory and seems headed for broad use because of its obvious advantages. The increased efficiency of a vapor system is expected to allow smaller radiators and more freedom of placement—for example, under the floor or in the trunk. This thought is intriguing to designers!

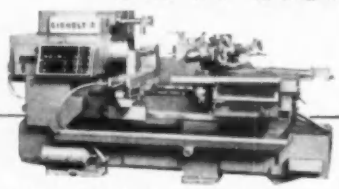
DEGREASING Chlorothene® NU specially inhibited 1,1,1-trichloroethane is continuing to make news in on-the-line cold degreasing because of its safety and efficiency. Chlorothene NU combines the property of low toxicity and *no* fire or flash point, as measured by standard methods. And corrosion-prone white metals show a high tolerance for Chlorothene NU.

DOW AUTOMOTIVE CHEMICALS LABORATORY

Created expressly to serve the needs of the automotive industry, Dow's Automotive Chemicals Laboratory is active in technical service and development. This laboratory is continually researching and developing coolants, hydraulic fluids, cutting and grinding fluids, functional fluids, fuel and lubricant additives, and synthetic lubricants. To see how this laboratory can be of assistance to you, contact your nearest Dow sales office or write Chemicals Merchandising in Midland.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

ON A GISHOLT AUTOMATIC RAM



Gisholt MASTERLINE AR Turret Lathe

From bar to chucking in less than an hour.
Sets up like a turret lathe, uses same standard tools.
Cycle setting learned in a day.
Automatic drill withdrawal for chip clearing.
Internal threading with solid taps.
External threading with self-opening die heads.
Reverse feed and individually adjustable dwell.
16 spindle speeds and infinite feeds—none lost when threading.

Ask your Gisholt Representative for a desk-side demonstration, or write for Catalog 1224.

Are you keeping step with new developments in automatic machining? Many of your competitors are—and cutting costs substantially. Even small runs—both bar and chucking work—are now going automatic. How? With the new, fast, easy setup designed into the Gisholt AR (Automatic Ram) Turret Lathe. Change-over time is the same as for a hand-operated machine. And—the automatic cycle cuts machining costs 25% to 40%.

To be competitive you *must* go automatic. Why wait? Investigate the Gisholt AR—your best answer to the cost profit squeeze.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

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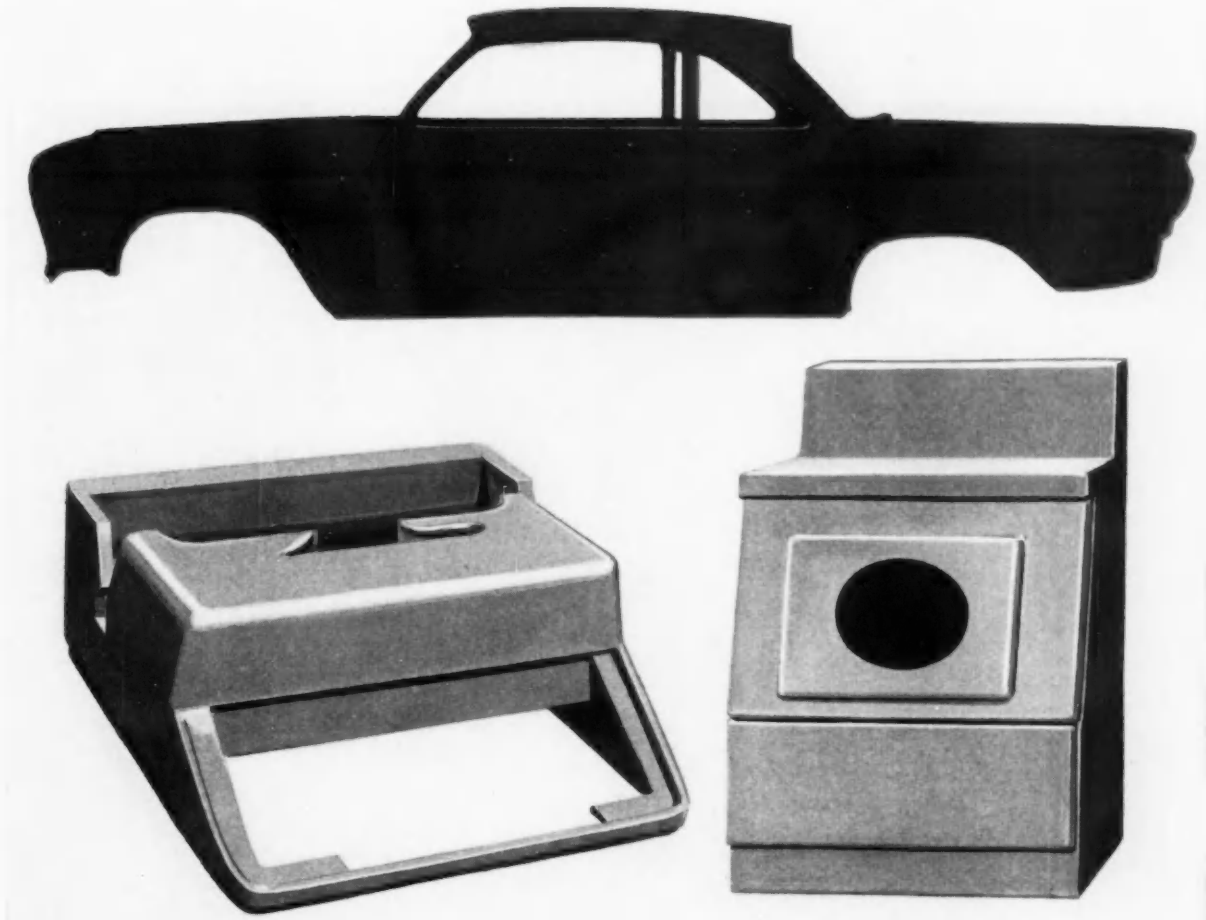
What's News in Enjay Resins...



BUTON® Resins produce tough, low-cost primers!

Buton resins contribute to low-cost, long-lasting protective metal primers. Several inherent properties make them a natural choice for numerous metal priming applications. Buton resins possess excellent hardness, toughness, and flexibility . . . combined with outstanding resistance to such corrosive materials as: detergents, salt spray, boiling water, plus many acids and alkalis.

Buton resins offer excellent adhesion on most metals, including steel, galvanized steel, tin plate, aluminum, and various light metals. In addition, they provide good intercoat adhesion with conventional top coats. The initial low selling price, plus the high bulk of Buton resins make possible new savings in primer formulations. For more information, contact Enjay at 15 W. 51st St., N.Y. 19, N.Y.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY

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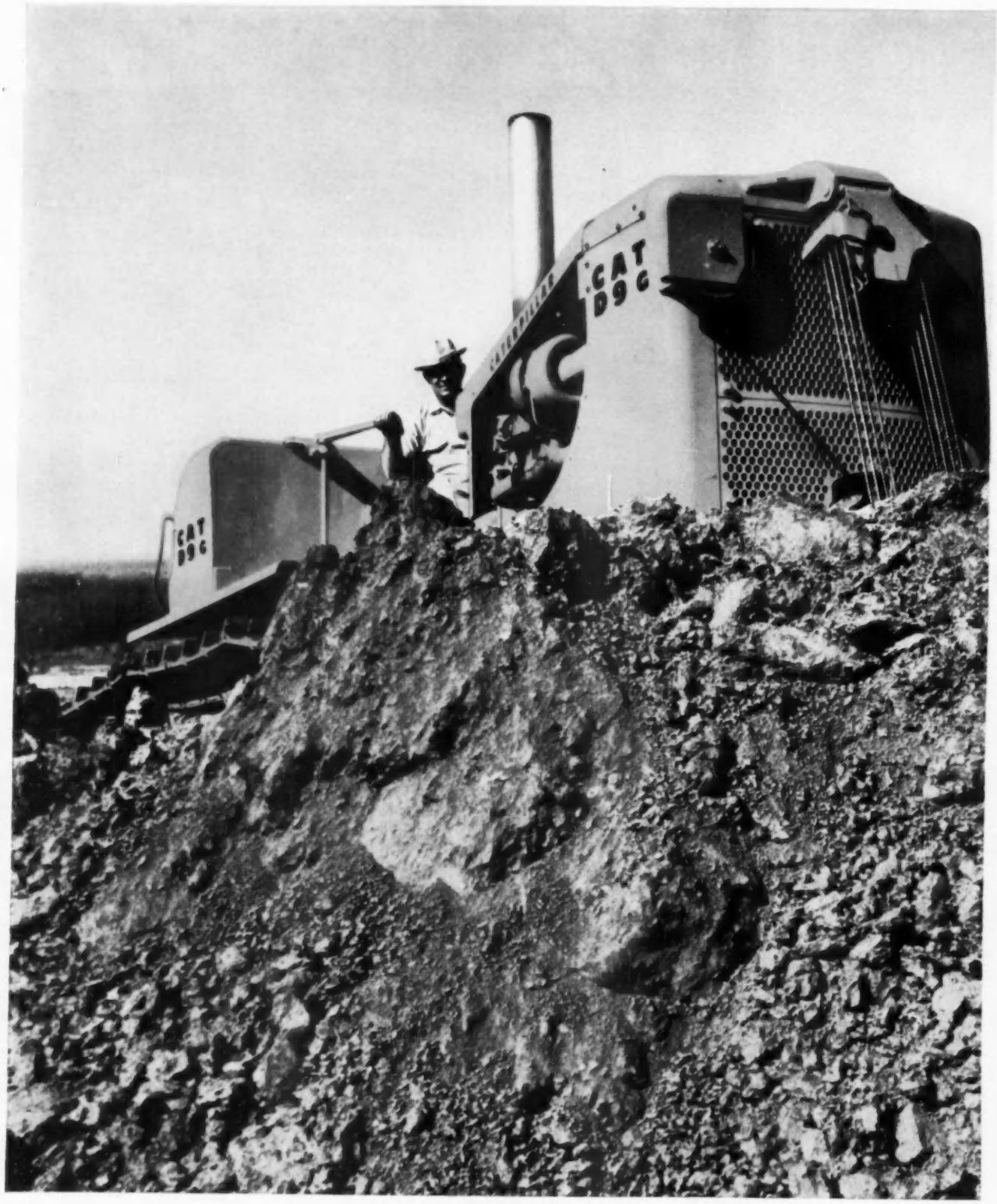
What makes D9s so



strong? And last so long?

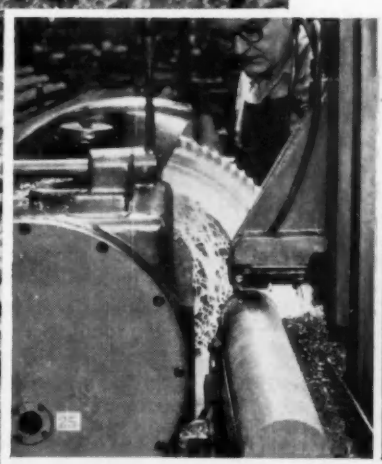
All Cat-built tractors *must* be able to take it—they lead a hard life. Especially the big, new D9G whose ferocious snarl is the result of a whopping 385 flywheel horsepower. That's an increase of 100 hp since the first D9 was introduced 5 years ago. It means that from stack to track, steel components have to be far stronger, more rugged. Solution: Caterpillar uses USS Alloy Bars for critical power train parts such as the final drive pinion. Says Caterpillar, "USS Alloy Bars meet our rigid specifications for strength, hardenability, durability, and precise tolerances."

USS Alloy Bars are not only exceptionally strong and durable, but they have excellent fabricating characteristics as well. Distortion during heat treatment and machining is an absolute minimum. USS Alloy Bars retain dimensional accuracy during quenching. And USS Alloy Bars are available in the widest range of sizes, shapes and grades in the industry. Order what you need from your nearest U. S. Steel sales office or Steel Service Center. USS is a registered trademark of United States Steel.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company

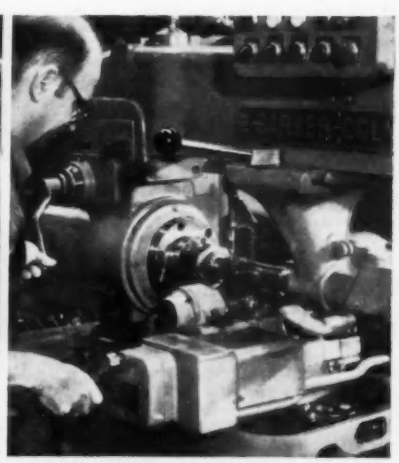
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

USS United States Steel



High-speed saw cuts USS Alloy Bars into proper lengths for finished parts.

Transmission shafts are rough ground to general tolerances before finish grinding.



Hob operation cuts teeth into shaft—precise tolerances are extremely important here.

This mark tells you a product is made of modern, dependable Steel.

THE LATEST DESIGN NEWS ON FHP MOTORS FROM LAMB ELECTRIC

Lamb Thinking on Universal Motors for a unique actuator application

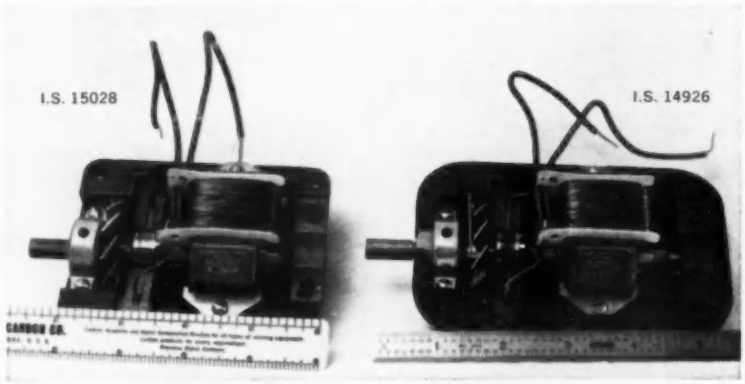
Here's what Lamb Electric designed into these motors:

In order to obtain the required speed and torques and retain the most economical and smallest package, a combination worm and spur gear reduction was used. Also, because of the peculiar space limitations in the application, special design considerations had to be given to the gear ratios and mechanical layout of the package.

In the initial stages of the design a motor was provided which met the specified speed and torque requirements, however it was soon discovered that this design overheated rapidly. Analysis of the first prototype tests showed that the load cycle had a particularly high torque peak for a very short duration. The motor was designed to supply this amount of torque near its stalled speed. It was found that by taking advantage of the accelerating rate and starting torque of a universal motor, the motor accelerated quickly enough to provide sufficient inertial energy to complete the duty cycle. This enabled the engineers to redesign for a lower peak horsepower output and obtain reasonable operating temperatures, thus producing the minimum size package consistent with the torque and temperature requirements.

The application was such that severe shock loading was encountered at a certain point in the duty cycle. In order to make mechanical construction that would withstand this service, ductile iron castings were furnished and special consideration had to be given to the overhung moment of the motor-gear unit to insure against damage due to vibration. Special bearings had to be used in this service because Brinnelling would occur on normal ball bearings under the severe service encountered. Lubrication is generally a problem under this short duty cycle, therefore, special consideration had to be given to insure that the lubricant protected the wearing surfaces at all times.

This is just a short example of Lamb at work . . . if you have a motor problem, let us help you with it. This is our business. Write: Lamb Electric, Kent, Ohio, and we'll have a Lamb District Engineer call on you to open preliminary discussion of your problem.



New Lamb motors represent advancements in small universal motor design

New design combines high quality and long life with relatively low manufacturing costs

Initially, the I.S. 15028 and companion motor I.S. 14926 were designed for powering rug agitators on a well-known line of canister-type vacuum cleaners. Now, many future appliance applications have been visualized. The range of ratings possible with this design (as high as 1/10 H.P. at 12000 RPM or ⅛ H.P. at 15000 RPM) makes this motor ideally suited for many motor powered domestic applications.

Some of the novel features of this motor project were:

The housing is a one-piece simple phenolic molding. It is designed in a half shell form in such a way that the motor bearings and other components can be held in accurate relationship with an unmachined housing.

The half shell housing of the motor is designed to mate with a corresponding opening on the customer's device to complete the motor enclosure. When a free standing motor is desired, this upper enclosure can be a simple stamping.

The I.S. 15028 motor was designed with a sleeve and a ball bearing. However, on other versions of this motor, either sleeve or ball bearings or a combination can be used at only a low tooling expense through use of easily interchanged inserts in the housing mold cavity.

The sleeve bearing as used in this design takes full advantage of the economics possible with the half shell motor design. The full-spherical shaped self-aligning type of sintered bearing is mounted directly in a semi-spherical recess in the housing. A spring clip presses against the top of the bearing to secure it in place while at the same time permitting self-alignment movement. Life-time lubrication is provided by an oil soaked felt strip located beneath the bearing. There are other features worth noting in this unique design problem. For further particulars, write to Lamb Electric Co., Kent, Ohio.

a fuel-pro gasket
progress report

WINS OEM approval!

Now adopted for one or more applications by leading car factories and manufacturers of trucks, diesel engines, farm tractors, etc.

REASONS: EXCEPTIONAL DIMENSIONAL STABILITY, CONFORMABILITY, SEALING ABILITY, GREATER RESISTANCE TO HIGH PRESSURES AND TEMPERATURES, AND MANY OTHERS.

new FEL-CoPRENE®

the new rubber gasket for cylinder head covers, crankcase and automatic transmission oil pans, etc.

Fel-CoPrene is being used increasingly for O.E.M. Proving ground and laboratory tests, backed by several years of astonishing results on millions of cars, prove beyond doubt Fel-CoPrene is a most superior sealing material. It solves leakage problems, eliminates costly returns and is unaffected by oils and mild solvents.

Fel-CoPrene is an exclusive rubber formula developed by Fel-Pro in cooperation with leading car factories. Its exceptional dimensional stability eliminates those annoying problems of fit. Even after months of storage, Fel-CoPrene does not break . . . become brittle . . . lose resiliency . . . or change its size. It will not stick or tear even after prolonged high-temperature operation—comes off cleanly in one piece.

For complete details, specific performance statistics and cost data write FELT PRODUCTS MFG. CO., Skokie, Illinois. In Detroit: 19932 Livernois Ave. Phone: UNiversity 2-3522.

FEL-PRO gaskets

gasket specialists
since 1918

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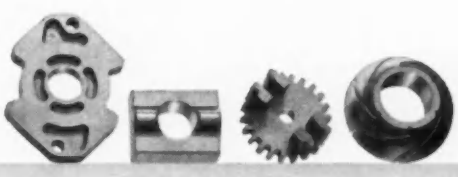
NEW
MODEL?
NEW
PRODUCT?

NOW'S THE TIME TO EXPLORE NEW SAVINGS WITH DELCO MORAINE SINTERED METAL PARTS

Designing or redesigning a product? Look carefully at components. If they're needed in quantity, Delco Moraine sintered metal parts may offer important advantages in cost, operating efficiency and improved reliability. It may be possible to design a single sintered part to replace a sub-assembly of several parts. Or eliminate the need for expensive machining operations. Or provide a special characteristic to lengthen product life, or improve performance. The controllable porosity of sintered metal parts, for example, permits impregnation with oil for lifetime self-lubrication. Give your new model or product every production break you can. Show components to engineers from Delco Moraine, a leader in the industry for forty years. They know when and how sintered metal parts can best be used. It's to your profit to know, too—and the best time to find out is now, in the planning stage.



DELCO MORAINE

Division of General Motors, Dayton, Ohio

Link-Belt's narrow automobile timing chain started...

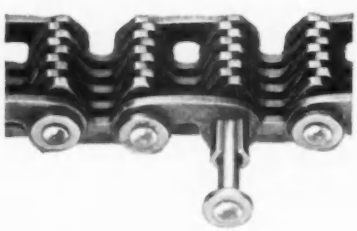
a 12-year economy run

Narrow chain accommodated 100% hp increase, saving millions in production costs

Introduced in 1949, Link-Belt's narrow, ½ inch pitch timing chain is still "in time" with today's higher horsepower, higher compression engines. Even with the 100% increase in horsepower over the last twelve years, the exceptional durability of this chain has helped keep engines running smoothly, quietly, and dependably.

Today, this narrow timing chain is the choice of three of the four major auto manufacturers. It's been time-tested and performance-proved in millions of car miles.

Link-Belt engineers are readily available to help you find the potential savings in applications of Link-Belt narrow timing chain for your engines in the planning stage. For the complete facts and economic advantages, write for Book 2065. 15,571



Bowed segmental bushings provide joint snugness.

After initial assembly in chain, bushings are straight.

Bow in bushings acts to keep a snug joint on nonload side, arresting chain whip, providing a smoother, quieter, long-life drive.

ORIGINATED BY LINK-BELT, the bushed joint and free rotating pin were designed for quietness, smoothness and long life. Millions of cars on the highways attest to the success of this design. Note absence of connecting links and solid guide links that add weight to chain and increase centrifugal loading.

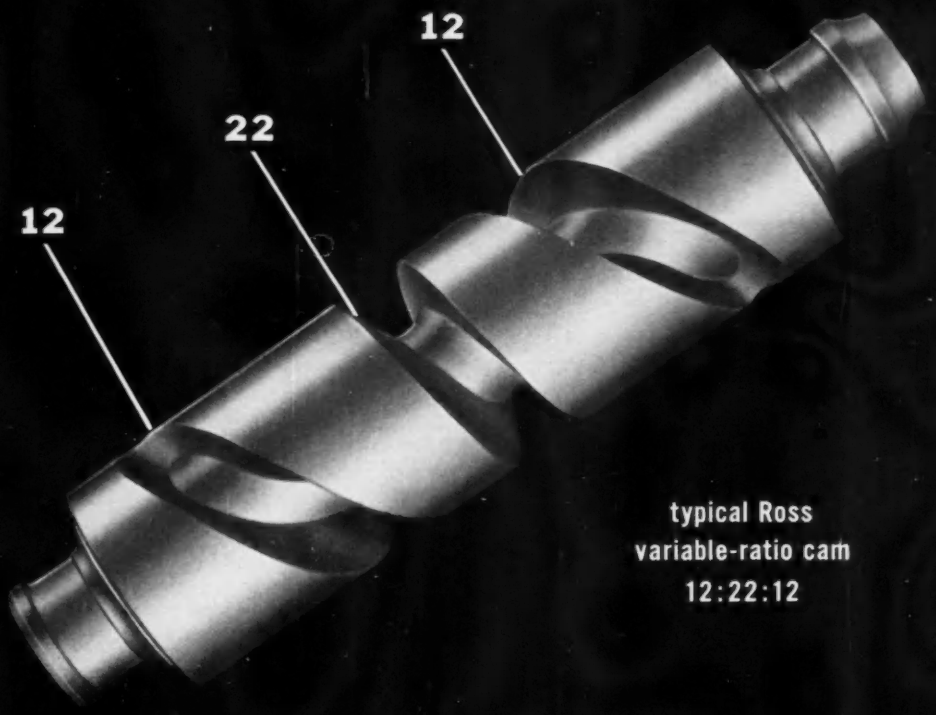
LINK-BELT

TIMING CHAINS AND SPROCKETS

LINK-BELT COMPANY: 220 South Belmont Ave., Indianapolis 6, Ind.

Circle 122 on Inquiry Card for more data

Engine fast? Steering slow?



Gear your handling to your go

Let your steering be nimble, alert, responsive . . . with *fewer* wheel turns. Ross *variable-ratio* steering gives faster steering and quicker recovery for cornering and slower steering and greater stability for straight-ahead handling.

Ross variable-ratio steering has been proved in service by 31 of today's leading vehicle manufacturers. Ross invites *your* inquiry.

Ross STEERING

ROSS GEAR & TOOL COMPANY, INC.
Ross Division, Lafayette, Indiana • Gemmer Division, Detroit, Michigan

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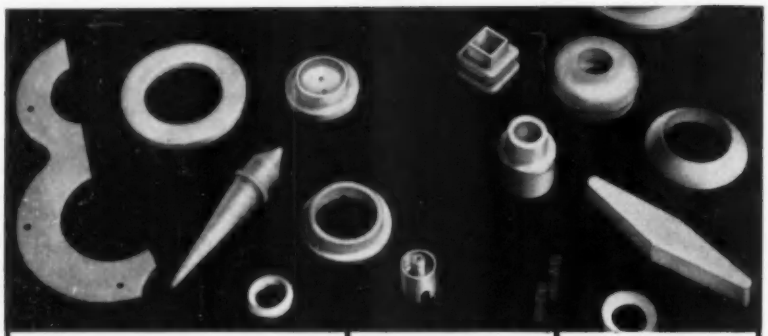
PLASTICS
in Design
Engineering



PROPERTY	TEFLON (TFE)	TEFLON (FEP)
Specific Gravity	2.1-2.2	2.1-2.2
Tensile Strength, 73°F	2500-3000 psi(a)	2700-3100 psi
Elongation, 73°F	100-200%	250-330%
Compressive Stress at 1% Offset	1000 psi	700 psi
Impact Strength, Izod Notched, 77°F	3.0 ft. lb./in. of notch	Does not break
Heat Distortion Temp., 66 p.s.i.	270°F	162°F
Coefficient of Linear Thermal Expansion (Approximate Values per °F)	5.5 x 10^{-5} in./in./°F	5.23 x 10^{-5} in./in./°F
Dielectric Strength, Short Time, 1/16"	400-500 v/mil(b)	400-500 v/mil(b)
Surface Arc-Resistance	700 seconds(c)	165 seconds(d)
Volume Resistivity	$>10^{15}$ ohm-cm.	2 x 10^{15} ohm-cm.
Dielectric Constant (60 Cycles)	2.0	2.2
Service Temperature Range (Max.)	+500°F	+400°F
Service Temperature Range (Min.)	−395°F	−395°F
Water Absorption	0.0%	0.0%
Flammability	Nonflammable	Nonflammable

(a) Tensile strength in oriented film may be as high as 15,000 psi.

(b) Value is 1000-2000 v./mil in thicknesses of 5 to 12 mils.

(c) Does not track.

(d) Samples melted in arc after 15 seconds, but did not carbon track.

This table compares the properties of Teflon* TFE and FEP. The newer FEP can be injection molded. In designing, consult your Garlock plastics specialist for best application results.

In designing intricate parts, consider the benefits of Teflon as a material.

Teflon offers a unique combination of properties unmatched by other plastics. It possesses the lowest coefficient of friction, the best non-stick characteristics, the most complete chemical resistance and the widest useable temperature range available in any plastic. Teflon eliminates lubrication, corrosion, contamination, seizing; it reduces friction, wear, space required, weight. Teflon can be used in a thousand different ways—for packings, gaskets and seals . . . for connectors, insulators, and test points . . . for valves, bearings, couplings, and insulation.

In producing intricate Teflon parts, consider the benefits of Garlock as a supplier. From virgin powder to finished piece, Garlock closely controls each step in the process to assure that the final part performs to your expectations. Complete facilities are at your disposal for molding, extruding, and machining of Teflon. If your application calls for special properties, Garlock will compound Teflon with selected fillers to greatly extend its service range. If you need unusually large configurations, Garlock will fusion-weld Teflon . . . the weld will have the same thermal, chemical and electrical properties as the Teflon itself.

Parts made from Nylon, Delrin*, C.T.F.E., Lexan† are also available from Garlock. Let your local Garlock representative quote on your design, or ask his assistance on any design problems concerning materials and applications. Call him at the nearest of the 26 Garlock sales offices throughout the U.S. and Canada. Or, write for Catalog AD-177. Garlock Inc., Palmyra, N.Y.

GARLOCK

Canadian Div.: Garlock of Canada Ltd.

Plastics Div.: United States Gasket Company

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

*DuPont Trademark
†General Electric Trademark

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Circle 125 on Inquiry Card for more data ⟶

stainless

because no other metal will do the job as well—

stronger
handsome
ever-bright
non-corrodible
easy to clean

thanks to

Superior

STAINLESS STRIP STEEL

Your fire extinguisher with the stainless body features a very good reason for being ever-ready for service: stainless steel is the *changeless* metal — good as new, year after year, without costly maintenance. • Made of SUPERIOR Stainless Strip Steel, the extinguisher body is easy to draw and weld—always uniform in behavior and performance because of uniformly Superior quality, coil after coil. Let us quote on your stainless requirements.

SUPERIOR STEEL DIVISION

OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

HOUGHTON METAL QUENCHANTS

A practical approach to quenching

The three most common media used for quenching steel are water, brine and oil. Water offers rapid cooling, good hardness, penetration and low cost but may cause quench cracks. And it rates low in uniformity and size retention. Brine is even faster than water. It removes heat more uniformly but it, too, produces distortion and quench cracks. Oil is milder. It does not remove heat as fast as water or brine, but will minimize distortion and cracking.

Generally speaking, plain carbon steels require a high cooling rate such as that of water or brine for maximum hardness. Most alloy steels require a lower quenching speed for hardening, with some high alloy steels, such as high-speed tool steel, hardening fully in air.

Thus, the determination of what quench to use depends on the steel analysis, the quenching speed the specific steel requires, and the physical properties called for in the finished part. As a guide, here are six distinct quenchants developed and produced by Houghton. They provide full coverage of the complete range of cooling speeds called for by various steel analyses and the physical properties required in the part:

1. **A high-speed oil** that quickly quenches critical alloy steels for maximum hardness.

2. **A general purpose oil** that provides adequate hardness, superior toughness and low distortion in a wide range of alloy steels.

3. **A martempering oil** which can be maintained at 350°F. for long periods. For interrupted quenching to provide toughness and close size tolerance.

4. **Molten salt** for interrupted quenching at temperatures up to 1000°F. . . . for martempering, austempering and patenting.

5. **An additive for water** to minimize quench cracks.

6. **A concentrate** for addition to tanks of 100° paraffine oil to improve stability and accelerate the quenching rate.

If you are looking for improved physicals, better heat treat uniformity or fewer rejects, you can get experienced advice from Houghton—a leader in metallurgy for more than 50 years.

COMMON-SENSE QUENCHING HINTS

1. Provide oil circulation so that all surfaces of parts to be quenched are exposed uniformly to the oil. Containers should be baffled. Avoid nesting of work.

2. When installing cooling coils, the water in the coils should run counter-flow to the oil to provide maximum temperature differential.

3. The quench tank should be equipped with a tight cover and a CO_2 extinguisher handy in case the oil should catch fire.

4. Avoid use of baskets in quenching where possible. It is better to drop small parts on a screen which can be lifted out of the bath. Basket congestion hinders uniform cooling.

5. Avoid temperature variation when water is the quenching medium. Hold to 20° maximum spread.

6. Distortion and quench cracks can be minimized by removing the work from the quench before it reaches the temperature of the fluid.

7. It is advisable to temper **immediately** after quenching to relieve stresses and avoid quench cracks.

8. Wherever possible oil quenched work should be cleaned prior to tempering in salt to minimize salt contamination.

Your nearby Houghton representative will gladly give you detailed information and help in analyzing your problem and recommending the quench best suited to your need. Call him or write for a copy of "Houghton on Quenching". E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

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NEWS

Vol. 125, No. 8

October 15, 1961

'T-Bird' 100 Lbs. Lighter

Bob Weights Eliminated on Convertibles

By James Dunne, Detroit Regional Editor, and C. B. Campbell, News Editor

As late as two days before introduction date, Ford Motor Co. decided to reduce the weight of the 1962 Thunderbird convertible by 100 lbs.

The hundred pound reduction affected vibration dampers weighing some 25 lbs. which were attached to each of the "Bird's" four fenders. Their purpose—to eliminate certain vibrations in the car to give it riding qualities found only in sedans.

100 Engineering Changes

But Ford's adoption of the dampers was only one of over 100 engineering changes made on the new T-Bird. The sum total of these modifications resulted in the car being "over-engineered" according to a Ford spokesman. Therefore, the last minute decision to eliminate the weights.

In automobile design, it is a little known fact that the Lincoln Continental convertible had bob weights attached to its underbody beginning in 1961. The Continental damper devices weigh 22 lbs. each.

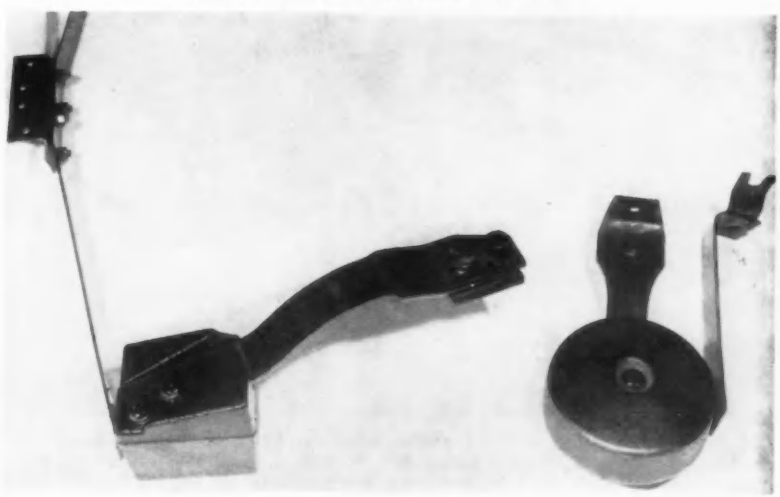
The dampers on the Continental are hooked to the body by a high tensile leaf spring. The spring and weight combination, when in motion, sets up a vibration frequency equal and opposed to the vibration of the car structure. Ford engineers say the frequencies cancel each other, eliminating most vibrations and shakes characteristic of soft top models.

Expect Tight Convertible

Why did Continental go to this design? One big reason is the noticeable shift to convertibles in luxury car buying habits. Many owners are driving a convertible for the first time, and expect the same tightness provided by hardtops. In a $7000 car they have 7000 reasons for being satisfied.

Another reason is the matter of

Bob Weights From '62 Thunderbird



cost. To accomplish the same results produced by the dampers, 300 more lbs. of structure-stiffening steel would have to be added to the car.

Ford engineers say the dampers bring the ride of the Continental convertible closer to the feel of a sedan than can be found on any other car.

AMC Slashes Prices

The pattern that began to develop when Detroit first announced 1962 car prices was followed, in a big way, by American Motors Corp. Of 27 regular models offered this year by AMC, 13 show price reductions of $112 or more. Seven of these, including all Ambassadors, were reduced by $209 or more.

All other Rambler models showed some reduction in price when compared with similar models in the 1961 line.

Pontiac, first to announce prices for its '62's, has kept its prices within $1 of comparable '61 models. All '62 Pontiacs have heaters and defrosters included in the list price as standard equipment.

In the full Chevrolet lineup, prices are slightly lower than comparably equipped 1961 models. The regular Chevrolet line has been reduced $10 for each model. The price on the Corvette and Monza is down $2. Other Corvair models sell for $12 less than in '61.

The new Chevy II carries an $1827 price tag on its lowest price two-door sedan, $10 more than the lowest priced Corvair. In the top of the line Nova series, the four-door station wagon lists at the factory at $2282.

Oldsmobile Unchanged

Oldsmobile prices, model for model, are substantially the same as last year's.

With its new V-6 engine, Buick has been able to reduce prices in the Special series $93 below the 1961 models which were equipped with V-8 powerplants. Prices on the V-8 powered Specials are essentially unchanged.

Realignment in Buick's regular line resulted in price changes ranging from a reduction of $55 on the Invicta convertible to an increase of $99 on the luxury Electra 225 convertible.

Prices on the Chrysler and Imperial lines, the first announced by Chrysler Corp., are unchanged with few exceptions. Newport convertibles and two-seat and three-seat Town and Country wagons have been lowered $35 to $60.

Plymouth, Dodge, Valiant, and Lancer have sliced prices on every model. Cuts range from $13 on the Fury to $70 on the nine-passenger station wagon in the Plymouth line, and $23 to $40 on the Valiant. Dodge and Lancer cuts range from $32 to $70.

Lincoln Continental remains unchanged.

American Motors plans a slight price reduction for their new models.

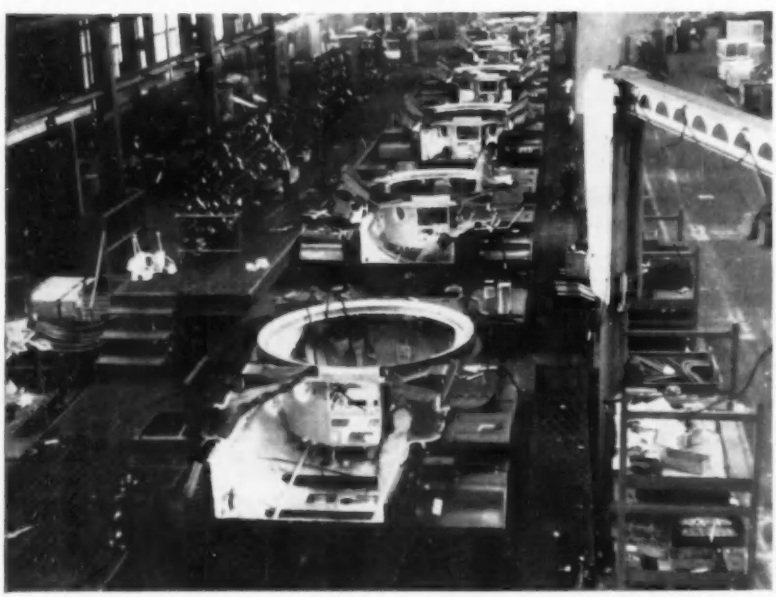
Smog Fight Widens

A consultant to the California Motor Vehicle Pollution Control Board has completed a three-week survey of British automakers' experience with crankcase ventilation devices for possible adaption to U.S. automobiles.

The trip by Joseph R. Scanlin followed approval by the board of a crankcase emission device developed by the AC Spark Plug Div. of General Motors Corp. Estimated cost of the device, including installation, is estimated at from $10 to $40.

Another crankcase device must be approved by the board. Then, a year must elapse before they must become a part of all California cars.

TANKS ROLL OFF PRODUCTION LINE



The Army's M-60 tank rolls off production line at Detroit Tank Arsenal. The 50-ton tank carries a 105-mm turret gun, 50-caliber machine gun and the new, lightweight 7.62-mm machine gun that fires standard NATO cartridge.

New Industrial Engines

Onan, a division of Studebaker-Packard Corp., has announced a move to step up its competitive position in the industrial engine field.

The Minneapolis firm is introducing a new line of industrial engines and engine-driven generators "that will bring new advantages to consumers through marked improvements in manufacturing processes," according to C. W. Onan, president.

The new "J" line is a family of engines that features interchangeable parts; choice of gasoline, gas or Diesel fueling; and water-cooled or air-cooled models—all fabricated from one basic set of tooling.

The 12 engines (with matching generators) have an output range from 5 to 40 hp (3 to 15 kw). They are of the ohv, four-stroke type, and will be built in 1, 2 and 4 cylinders.

Cylinders and crankcase are integral in each case, and of cast iron. The cylinder heads are of cast aluminum alloy. Fillets of the ductile-iron crankshafts are shot-peened, and crankshafts are used interchangeably between gasoline and Diesel models having the same number of cylinders.

The valves are free to rotate. Exhaust valves have Stellite faces. Intake valve seats are Ni-Resist and exhaust valve seats are Stellite, both replaceable inserts. Valve guides are of aluminum bronze.

Full pressure lubrication is employed on the new series. The Diesel connecting rods are drilled for oil to piston pins and piston cooling.

Automatic chokes are furnished with the electric-starting models.

There are four gasoline-engine ignition options — Onan flywheel magneto with timing advance, battery ignition with breaker points, battery ignition with distributor, and impulse coupled magneto. The new Onan-developed flywheel magneto is said to produce 20,000 v at only 100 rpm; and to provide up to 35 deg of advance when moving into the running range.

The output generators have revolving fields and static exciters. They were designed and are being built by Onan. In service a choice can be made of any one of several standard-voltage outputs, the variations being obtained by simple changes of wire connections.

1962 Simca "5"

While introducing numerous mechanical improvements, the 1962 Simca "5" retains its exterior styling except for straightening the narrow chrome strip extending from headlight to taillight on either side.

The Simca "5" four-door sedan is powered by a new high performance engine with a five-bearing crankshaft and is rated at 65 hp, a 30 per cent increase over the present Simca engine.

A new feature of the Simca "5" engine is a manual choke, mounted on the instrument panel to the left of the steering column.

The engine also features a new oil filter and intake silencer. A new centrifugal purifying oil filter is mounted on the end of the crankshaft.

Engine of New Simca "5" Has 30 Pct. More Horsepower

NEWS

CONTINUED

Britain's Drive for Executive Aircraft Stressed at Farnborough Air Show

By David Scott
British Correspondent

Main news from this year's Farnborough Air Show was Britain's first serious entry into the field of executive aircraft. This was by British Executive & General Aviation Ltd. (Beagle), a group formed a year ago by Pressed Steel in conjunction with Auster and Miles to make light planes.

It introduced a range of small piston craft, the newest being the Beagle B.206 powered by a pair of 260-hp Rolls-Royce Continental 10-470A engines. Span is 38 ft and gross weight 6310 lb, cruising speed is 228 mph and maximum range 1720 miles.

External Loading Hatch

The basic five-seat cabin layout includes a wash basin and toilet, baggage compartment with external loading hatch, and integral hydraulically-operated stairs. A seven-seat arrangement is optional. Domestic price is expected to be under £30,000 ($84,000).

Big Market Seen

In Britain at present there are fewer than 200 business planes operated by some 50 private companies. Beagle hopes to expand this potential market with its low-cost aircraft, and to move into exports as well.

Aimed at volume sales, the A.109 Airedale is a high-wing four-seater with front and rear doors and cabin arrangement like an automobile. Engine is a 175-hp Rolls Continental GO-300. Cruising at 135 mph the plane has a range of 650 miles, or 1050 miles with extra fuel tanks. Price has been fixed at £4750 ($13,300).

Another member of the "Beagle pack" is the A.61 Terrier, a civil development of the military Auster Mark 6, tagged at less than £2000 ($5600). For the future the company is preparing the M.218 four-seater with twin 100-hp engines. Scheduled to fly early next summer, it will be in the £5000 ($14,000) class. A single-engined version, designated M.117, also is planned.

Produced by Rolls-Royce

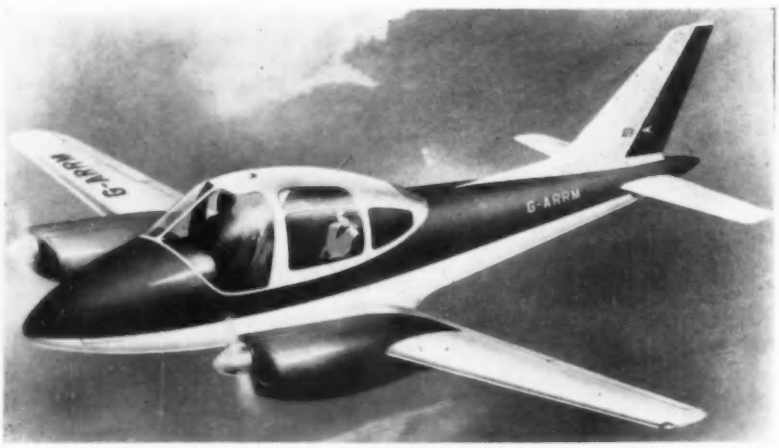
The Continental air-cooled engines used by Beagle are produced in England by Rolls-Royce under license with the American company. Rolls has the exclusive rights for the full range of engines in Europe, and for British-made ones in Australia and New Zealand. It also has non-exclusive rights for the rest of the world excluding the U.S.A. and certain Far East countries. Production deliveries from the Crewe automobile plant will begin next year.

Another Farnborough disclosure in an entirely different field was the first public showing of the Handley Page H.P.115 arrowhead research aircraft. With wings swept back at about 80 degrees and spanning only 20 ft, it is claimed to be the slimmest delta in existence.

Edges Interchangeable

It is designed to study the slow-speed handling characteristics of supersonic airliners during take-off, approach and landing. Wing leading edges are interchangeable so that performance of different forms can be investigated, and results are being applied to the problems of Britain's future Mach 2.2 transports. A single Bristol Siddeley Viper jet of 1900-lb thrust is carried on the tail. Top speed is only 300 mph.

The Argosy 660, military version of the Armstrong Whitworth Argosy twin-boom Freightercoach, also made its debut. Gross weight is increased to 97,000 lb, clam-shell rear doors replace the side-hinged tail section, and more powerful Rolls-Royce Dart turboprops are used. Armstrong Whitworth recently merged with Gloster to form Whitworth Gloster Aircraft, further strengthening the Hawker Siddeley Group of which both are members.



Beagle B.206 Five-Seat Executive Plane

THE 7 HATS OF BORG-WARNER . . . (top) national defense; oil, steel and chemicals; (middle row) agriculture; industrial machinery; aviation; (bottom) automotive industry; home equipment.

From under the 7 Hats of Borg-Warner...

News of advanced auto transmissions now in '62 models!

ANNOUNCING: A 3-SPEED AUTOMATIC TRANSMISSION for the new, popular small cars. Lightweight and compact, this is a smaller version of the famous 8-cylinder car transmission from Borg-Warner's Warner Gear Division. Behind this product is a 60-year tradition of engineering and production skill in the manufacture of automotive components. Connected either to lever or push-button gearshift controls, this unit is a versatile newcomer . . . adopted by makers of both American and British cars for 1962.

ANNOUNCING: A "STICK SHIFT" WITHOUT A CLUTCH PEDAL! Now, you can have the economy of a standard transmission and the convenience of automatic—without the footwork! This perfected automatic system from B-W's Borg & Beck Division eliminates the clutch pedal, operates all gears from a "stick shift" mounted by the steering wheel. The secret? A hydraulic system using engine oil pressure. This simplified, trouble-free drive asks little effort or skill from the growing number of "stick shift" fans.

B-W **BORG-WARNER**®

. . . better products through creative research and engineering

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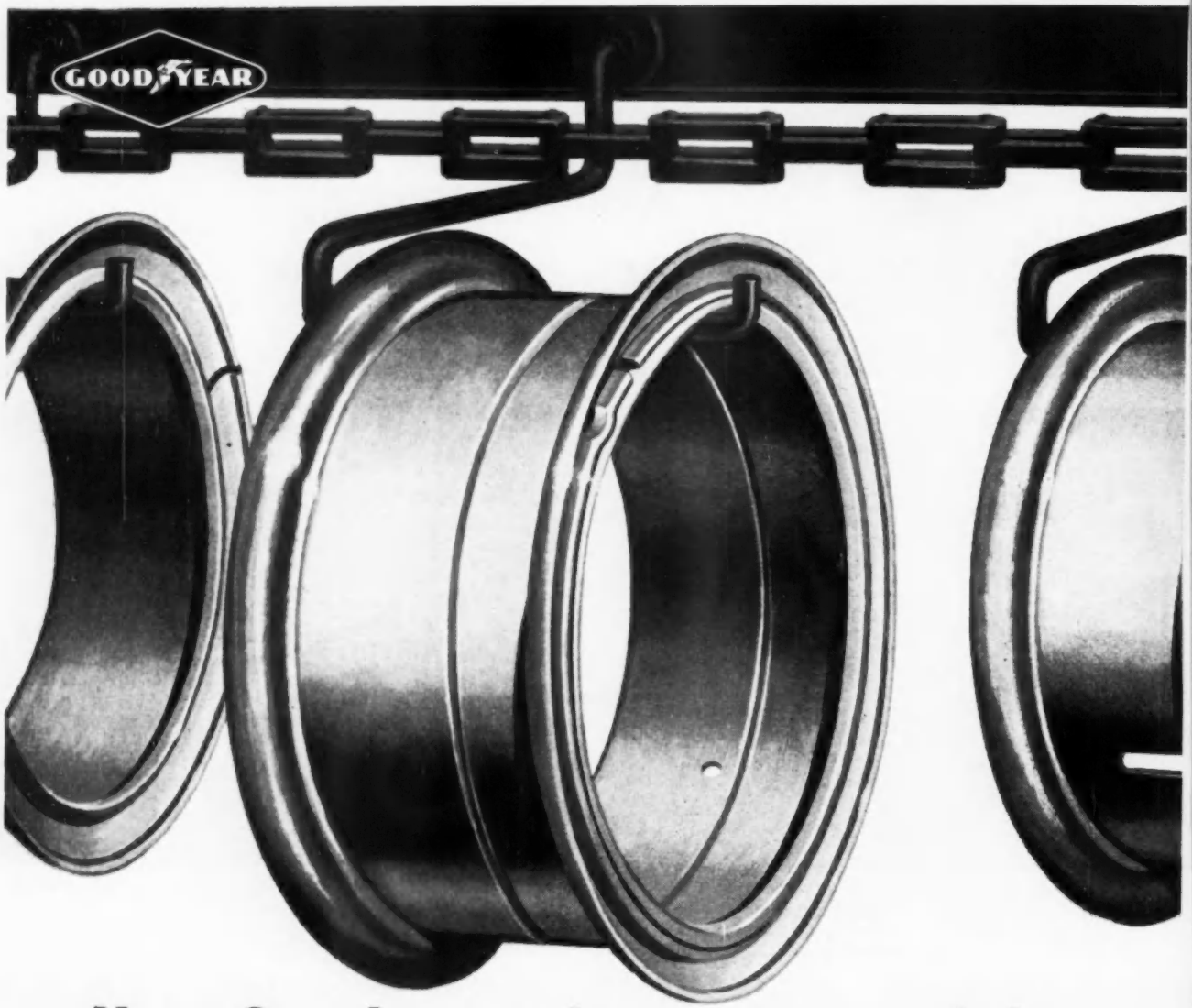

Now Goodyear rims are precision-

These new Goodyear precision rims, for over-the-road use, are built to such close tolerances they better industry standards by *a full fifty per cent.*

What's more, Lateral and Radial Runout will not exceed 1/32 of an inch.

For *equipment manufacturers* this means a complete line of over-the-road rims to match the most accurately made wheels for use on their equipment.

For *fleet owners and operators* the immediate benefits are longer tire mileage, less down

Lots of good things come from GOOD

built to run 50% truer

time and a lower cost-per-mile operation. Vibration is markedly reduced and so is driver fatigue.

Whether you're a manufacturer or the owner of one truck or of an entire fleet of trucks, it will pay you to specify these revolutionary new rims. For additional information on what they can do to improve operating efficiency and lower your costs, write Goodyear, Metal Products Division, Akron 16, Ohio. Or, if you prefer, get in touch with your local Goodyear Rim Distributor.

YEAR

More tons are carried on Goodyear rims than on any other kind

make your plastic parts

There are hundreds of companies in the United States who are ready to guide you in every phase of plastic product development. They're called custom molders . . . companies who buy plastic resins from producers like Koppers, then process the resins into finished plastic products.

Custom molders know exactly what plastics can and cannot do. They make sure you use the right plastic, that processing equipment works as it should, and that your product is manufactured at a competitive price. Many automotive designers have already contacted custom molders for advice on the 200 plastic parts they put in some of the 1961 models.

For a list of custom molders of polyethylenes and polystyrenes, write or call our Detroit Sales Office, 301 W. Eight Mile Road, Detroit 3, Michigan. Telephone: FOrest 6-5200. Or write directly to Koppers Company, Inc., Plastics Division, Dept. 117, Pittsburgh 19, Pennsylvania.

Koppers makes these fine plastics: DYLITE® expandable polystyrene, DYLENE® polystyrene, DYLAN® polyethylene and SUPER DYLAN® high-density polyethylene.

KOPPERS PLASTICS

KOPPERS

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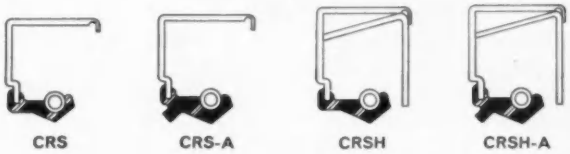
C/R®

DESIGN NOTES

C/R offers new bonded CRS Seal design in standard sizes — without premium tooling charges



Design Advantages

The CRS Seal now provides a new level of C/R Seal performance through its simple, bonded design. There are no internal parts to misalign, no avenues for internal leakage. The shell and sealing member are integral — bonded securely for the long life of the seal. The CRS Seal incorporates a sealing member with both improved lip configuration and improved concentricity. The sealing member has been strengthened over former designs by placing more material at points of major flex and wear — and without increased shaft loading.

Designer Advantages

The CRS Seal gives the designer one, basic, rugged shaft seal design which may be applied with high reliability to the great majority of common shaft seal applications — particularly in industrial, automotive, farm, and off-the-road equipment.

Four basic design variations are available. As you can see, these provide an auxiliary sealing lip, where it may be required, or provide extra rugged shell construction where conditions suggest the need to protect the seal lip against assembly damage — or where large, heavy-duty shafts are being sealed.

Selection of the new C/R Type CRS Seal gives the designer and buyer major advantages over special seals: shorter lead time on orders, simpler specification, savings in time and money, and improved assembly quality and reliability.

Operating Maximums*

Shaft Speeds	3600 fpm (single lip) 2500 fpm (double lip)
Run-out	.015" TIR dynamic eccentricity .010" static eccentricity
Temperature	−30 to +275°F. (225°F. in EP lube)
Pressure	5 psi (single lip) 10 psi (double lip)
Media	Oil, grease, fuel, water

Not all conditions present in one application

New, Improved Compound

Standard sealing members for the C/R Type CRS Seal are molded of a new Sirvene synthetic rubber compound having markedly superior sealing and wearing properties. It is a Buna-N-based material with low-friction characteristics. The CRS Seal can also be furnished in the usual special materials such as acrylates, Silicones, and butyls. Shells are of standard steel, but can be provided in corrosion-resistant materials on special order.

Consult C/R Engineers

For assistance on the application of the new CRS — or on any oil seal problem, get in touch with C/R Oil Seal Engineers. They're specialists in fluid sealing — and will gladly cooperate with you.

For More Design Data:

You will want the complete design data on the new CRS Seal. Write for our Bulletin CRS-100. It gives you the complete list of standard sizes, widths, O.D.'s, shell thicknesses and sealing lip heights. You will want it to compare and then specify C/R's CRS Seal.

CHICAGO RAWHIDE MANUFACTURING COMPANY

1205 Elston Avenue • Chicago 22, Illinois

Offices in principal cities

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In Canada: Chicago Rawhide Mfg. Co. of Canada, Ltd., Brantford, Ontario

Export Sales: Geon International Corp., Great Neck, New York

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In tool steel specialties...

A-L's F & C TRIPLE BARREL SERVICE

BRINGS DOWN TOOLING COSTS

Only Allegheny Ludlum's Forging and Casting Division of all the companies in the U. S. supplies tool steel in cast-to-shape form, in forgings, and in composite die sections. Usually, of course, your design will strongly indicate which of these processes should be used. But when you have a case that is not clear-cut, you will especially appreciate the uniqueness of A-L's triple barrel service.

Because A-L's representatives are familiar with all three processes they give you an unbiased recommendation. Your A-L representative's only concern is for making your parts in the best and most economical manner. He's never under pressure to promote one process against another. You can put your trust in an A-L recommendation.

√ A-L's **Cast-To-Shape** tool steels are made of electric furnace steel melted to precise laboratory standards. Exacting foundry practice enables A-L to make castings—even very intricate shapes—so that little stock need be removed for finish. Why buy metal you don't use?

√ A-L's **Composite Die Sections** are made of fine A-L tool steel cutting edges electrically butt welded by a special process to nonhardenable mild steel bases. A wide range of straight and shaped sections is available in a huge array of sizes.

√ A-L's **Hammered Forgings** come in an extensive range of shapes and in sizes up to 3,000 pounds. You can be sure of quick delivery from A-L because all A-L tool steel forgings are made from huge stocks of genuine A-L billets.

For complete information on A-L's triple service ask your A-L representative for a copy of the 28-page booklet FC4, or write: ***Forging and Casting Division, Allegheny Ludlum Steel Corporation, Ferndale, Detroit 20, Michigan. Address Dept. AI-10.***

AL® | **ALLEGHENY LUDLUM**
FORGING AND CASTING DIVISION | 3280

NEWS

FEATURES

Wider Copper Market?

Industry Seeks Expanded Use in Cars

Leading makers of wrought copper-metal mill products are accelerating their technical liaison with the automotive industry.

Glenn P. Bakken, president of the Copper and Brass Research Association and president of Chase Brass & Copper Co., disclosed his industry's plans at a Detroit news luncheon.

"Copper is an old industry in point of time," Mr. Bakken said. "It is not unlike the automotive industry, however, in its youthful outlook toward the future. Our business constantly seeks to improve products, make them more useful and to render an all-around service more valuable to our customers. Now, it is proposed to accelerate and channel much of this effort directly to specific production needs. We are beginning with the automotive industry.

One Phase of Effort

"This is only one phase of a renewed effort on the part of all facets of the copper industry. For instance, one of my corporate competitors and neighbors in Waterbury, Conn. — the Anaconda American Brass Co.—dedicated a $1½ million, research center within the past few weeks. Just over a month ago, Olin Brass, a division of Olin Mathieson Chemical Corp., announced a substantial increase in expeditures on research and development. We at Chase Brass & Copper Co. are constantly expanding our research activities.

"My parent company, Kennecott Copper Corp., is stepping up its research program with an entirely new laboratory at Cambridge, Mass. This will be headed by Dr. Ewan Fletcher, of the Massachusetts Institute of Technology, who has served as consultant to many leading industrial firms. Its primary function will be basic and applied research with emphasis on the solid state physics of metals."

Dr. Charles H. Moore, technical director, Copper Products Development Association, declared the industry has had to adopt research and development to keep abreast of the fantastic needs for goods of all kinds that are being forecast for the future.

10 Million by 1975?

"The automotive industry," Dr. Moore said, "which this year produced six million cars, could be called on to produce 10 million cars by 1975. The electric utility industry, which has grown at a compound rate of seven per cent over the last 40 years, expects that its output by 1980 will be 2795 billion kilowatt hours, as compared with 753 billion kilowatt hours in 1960.

(*Turn to page 47, please*)

ENGLISH FORD CAPRI HAS BUCKET SEATS

Based on the Consul Classic 315, the Capri has an "aerofoil" hardtop that cuts height to 52 in. The two-door coupe has bucket seats with an occasional seat in the rear. Side windows pivot into the body. It has 56.5-hp engine and four-speed transmission.

AI TABLOID

The eighth in a series of worldwide technical literature surveys, principally in the polymer and plastics fields, has been compiled by the Army Chemical Research and Development Laboratories. Also available is a report describing effects on crystalline and vitreous ceramic materials subjected to high-pressure techniques developed for diamond synthesis, and a report on research leading to cool running vinyl filler - elastomer stocks for tire manufacture.

* * *

Curves in roads in Northern Ireland and a street intersection in Akron, O., have something unusual in common. Both offer protection for motorists with rubber posts—originally designed as dock fenders—that absorb shocks for drivers who veer from the roadway.

* * *

Current Soviet research in corrosion apparently is on a par with similar investigations in the West—but there is no evidence the Russians are on the verge of "any major breakthrough." This is the conclusion of evaluators who recently examined 1500 references from Soviet technical literature.

* * *

A Michigan foundry is using small quantities of tin to increase the hardness of small gray iron castings and the uniformity of their hardness. The Sparta Foundry Co. has been experimenting with making tin additions to cast iron for three years. By adding .8 per cent tin to the iron, Sparta increased its hardness to a Brinell rating number ranging from 170 to 192.

* * *

An organic-cooled reactor designed to serve as an experimental facility in a program to develop economic nuclear power is described in an AEC report released to industry and the public. Also available are two AEC reports on a plutonium recycle test reactor and decontamination studies for water-cooled reactor systems.

Shipments of industrial gases by primary manufacturers in 1960 totaled $312 million, or about three per cent more than the 1959 figure of $302 million. The 1960 total is composed of $103 million for acetylene; $48 million for carbon dioxide, and $161 million for the product grouping elemental gases and other compressed and liquefied gases.

* * *

Metalworking machinery and equipment dealers reported sales totaling $510 million for 1958, up five per cent from the $484 million recorded in the previous business census year, 1954. At the end of 1958 there were 1098 establishments in the U. S. engaged in buying and selling new and used machine tools.

* * *

A computer program that analyzes word interrelations and order for 95 per cent of all sentences is a definite possibility in the next six months, according to an Army review of machine translation.

* * *

Potential outlets for U. S. machinery in the growing West German market are contained in a publication issued by the Bureau of Foreign Commerce, U. S. Dept. of Commerce. It gives the names, addresses and describes more than 300 machinery importers and dealers in West Germany.

* * *

The effect of vibrations on the fuselage of a jet airliner with one of its engines running at maximum take-off thrust is studied in an Air Force report. Also available is a report on audio warning signals for weapon systems.

* * *

A comparison of properties among brittle metals and nonmetallic substances which might be useable in tensile structures is presented in a research report. Also available are two reviews of recent developments in the technology of tungsten, and of metals-joining.

Bucket Seats Popular

The popularity of bucket seat vehicles on the American market is growing at an ever increasing rate. Since their introduction in 1955 on the Thunderbird and Corvette, about 650,000 American-made bucket seat vehicles have been sold. This trend is expected to increase in 1962.

E. F. Laux, vehicle marketing manager of Ford Div., Ford Motor Co., commenting on the trend said, "The increasing popularity of the bucket seat is further evidenced by the fact than an even greater number of 1962 model automobiles will offer bucket seats."

Currently, the bucket seat is offered on 15 different vehicles made by all five American manufacturers. Bucket seats were given their biggest boost when they were made available at a modest initial investment on the Corvair Monza. Other compacts quickly followed suit.

The new Dodge Polara 500 is following the lead of Bonneville and Starfire in offering bucket seats in the medium size car field for '62.

"Continuing at its present rate of growth, it is probable that more than a half-million bucket seat automobiles will be sold during 1962 alone," Mr. Laux said.

White Cars Cooler

A study of car heating and cooling by General Motors engineers reveals a white car is 15 degrees cooler than a black model after both were parked in sunshine for an hour.

The study also revealed that black or other dark colored cars were easier to heat. Light colored cars and cars with reflective type paint are easier to cool.

(*Continued from page* 45)

"These projections of future needs have stimulated the search for new materials that started after World War II. Science and invention began upgrading the properties of many materials some time ago. In some places they have approximated the properties of such basic materials as copper, steel and zinc through alloying, through blending with plastics, and through new mechanical designs that compensate for the lack of structural integrity in the starting materials. One of the reasons for this can be traced to the need to reduce the deadweight in structures and components. This has been especially true in automobiles, aircraft, and missiles.

World-Wide Studies

"Through world-wide studies we are attempting to improve the mechanical, esthetic, and structural properties of copper. Success in these areas will most certainly affect the end uses and economics of new copper products which will find places in all our major industries, including the various forms of transport — automotive, aeronautic and marine.

"Of immediate consequence to the automotive industry is the work we are doing on the use of copper as an alloy in cast iron. As we all know, gray iron is the dominant metal in the automobile engine, as well as the machine tool industry.

"The average automobile uses over 2200 lbs of steel, and 650 lbs of iron. At the moment, the industry is engaged in intensive studies that seek to develop high-strength, thin-wall cast iron for engine blocks that will weigh 30 per cent less than standard blocks.

Richard D. Chapman

"Another important effect that can be expected from the use of copper is the corrosion resistance it is known to impart to iron and steel alloys when added as an alloying agent. This should be of particular significance to engine manufacturers. Internal combustion engines that use sulphur-containing fuels have been known to experience severe corrosion wear in the cylinder walls.

Blames Silicon Content

"Recent investigations in England have indicated that the silicon content of gray cast iron is an extremely important factor in the corrosion of cylinder blocks where high sulphur fuels are used. In our studies of this problem we are trying to determine the degree to which corrosion-resistance can be improved when irons containing varying amounts of copper and silicon are subjected to a sulphuric acid environment.

"There is another group of research projects through which it is hoped the catalytic properties of copper and copper compounds can be used to promote the efficiency of internal combustion engines, and also decrease the hazards of health from exhaust fumes. The air pollution problem, as we all know, is directly related to combustion efficiency. We are investigating this problem through a number of approaches."

Mr. Bakken announced that in line with the copper industry's drive, Richard D. Chapman, 46, would head the Copper & Brass Research Association office in Detroit.

Mr. Chapman spent 25 years with Chrysler Corp. during which he rose to assistant chief engineer of basic sciences research. His work at Chrysler spanned a wide range of metallurgical research, pioneer studies in x-ray diffraction, metallographic investigations and dilatometric studies.

Aircraft Contracts

The Navy has announced contract awards totaling $62.2 million to the following companies:

Hiller Aircraft Corp., $6.6 million for the procurement of H23D helicopters which will be used by the Army.

Hughes Aircraft Co., $12.7 million for the procurement of airborne electronics gear.

Lockheed Georgia Co., Division of Lockheed Aircraft Corp., $10.6 million for the procurement of GV-1 aircraft.

Martin Co., $16.1 million for the procurement of Bullpup missiles.

Sikorsky Aircraft Division, United Aircraft Corp., $15.9 million for the procurement of HUS-1 helicopters.

EUROPEAN ROUND-UP

By DAVID SCOTT • Special Correspondent

Elimination of mixing gasoline and oil in the fuel tank for their two-stroke engines is a feature of the 1962 Auto Union and DKW cars. The system also varies the fuel-oil ratio according to load.

Lubrication oil from a one-gallon reservoir is fed to a belt-driven Bosch pump with worm gearing whose horizontal spur wheel is reciprocated vertically by ramp cams on its upper and lower faces. The plunger is an extension of the gear shaft, and its stroke is varied by a hook-up to the throttle linkage.

Spring-Loaded Downwards

The shaft is spring-loaded downwards, and located from below by a pin bearing upwards against the lower ramp on the gear. This pin is positioned vertically by a cam rotated by throttle movement. Oil is delivered to the main jet of the Solex carburetor, and mean mix ratio is 100:1 instead of the former 40:1 for these engines, so consumption is less than half.

The tank has a range of 1500 mi., and the need to add oil to the gas at every refuelling stop is avoided. A pressure switch and dash light warn of pump failure or lack of lubricant. Other advantages are the absence of the blue exhaust smoke characteristic of two-strokes, and the reduction of plug fouling and carbon formation.

Also in Germany, M.A.N. has produced a fuel injector nozzle whose needle valve is rotated to prevent seizing. A shallow helical groove is cut in the lower part of the valve, and the flow of fuel over its surface towards the seat imparts a rotary motion.

Another Diesel development, patented by Hanomag, is the use of a spark plug in the precombustion chamber to insure ignition at idling speed. Holes in the injector nozzle are arranged to broaden the spray at low engine speed, resulting in fuel being partly confined to the chamber by the narrow throat opening.

Daimler-Benz has devised a simple means of cooling burnt gases in the vertical exhaust pipe of rear-engined buses. The muffler exit pipe is centered in the flared mouth of the main vertical duct, and the venturi effect draws in air from the engine compartment to mix with the exhaust.

New DAF Engine

In Holland, DAF has introduced a larger 45.5-cu in. aircooled, flat-twin engine to power its new DAF 750 and Daffodil models. It features a coiled-tube oil cooler built into the blower casing. In addition, engine shrouding is integrated with the fresh-air heater to give greater interior warmth.

The belt-driven automatic transmission with variable-diameter pulleys has been revised to provide effective kick-down acceleration, and to down-shift to maximum engine braking when the brake pedal is jabbed hard.

Clayton Dewandre in England is developing a power-operated gearshift unit that can be applied to a standard manual transmission with only minor modifications. The striker rod engaging the selector forks is actuated by air servos.

Leyland hopes that its new-broom purge at Standard-Triumph-International will bolster the competitive position of the straggling member of Britain's Big Five. The staff has been severely pruned from top management down in an attempt to cut non-productive overhead.

While auto manufacture will definitely be continued, there will be more emphasis on light trucks to complement the Leyland range of heavy vehicles. Standard's Diesel may be developed for use in some of the parent company's smaller trucks, and it may return to tractor manufacture which was dropped a few years ago when it stopped making the Ferguson. Prototypes are already being developed.

Tractor Plants Booming

Britain's tractor industry is booming, with output well above last year's. Ford and Massey-Ferguson, the two leaders, are running at full capacity, but producers like International Harvester, David Brown and Nuffield have shown the biggest percentage gains. Leyland would like to get Standard back on this bandwagon.

Auto manufacturers in England, suffering from a sluggish domestic market due to the credit squeeze, expect that sales will pick up after Jan. 1. After that date no 10-year-old car with substandard brakes, steering or lights will be re-licensed. It is estimated that 600,000 registered vehicles with no test certificate will be put on the scrap heap.

INDUSTRY STATISTICS

By Marcus Ainsworth, STATISTICAL EDITOR

WEEKLY U.S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending Sept. 30	Weeks Ending Sept. 23	Year to Date 1961	Year to Date 1960
PASSENGER CAR PRODUCTION				
Total—American Motors	9,278	7,800	248,445	358,256
Chrysler	2,760	2,671	65,250	65,297
DeSoto				17,513
Dodge	5,623	5,122	103,538	308,183
Imperial	327	322	5,668	11,568
Lancer	2,282	2,039	34,909	26,144
Plymouth	6,358	5,446	124,397	195,289
Valiant	3,971	4,027	85,782	197,351
Total—Chrysler Corp.	21,321	19,627	419,544	821,345
Comet	5,015	4,577	138,787	141,359
Falcon	13,700	12,576	381,256	387,407
Ford	16,289	15,888	585,308	730,413
Lincoln	877	872	21,972	13,194
Mercury	3,675	3,148	77,463	114,627
Total—Ford Motor Co.	39,556	37,061	1,204,786	1,387,000
Buick	3,897		118,532	193,726
Buick Special	1,833		58,095	6,101
Cadillac	1,345	1,287	100,170	115,762
Chevrolet	14,686	698	821,664	1,210,318
Corvair	8,567	871	238,734	181,838
Oldsmobile	3,786	1,680	157,202	273,386
Oldsmobile, F-85	451	963	43,012	7,596
Pontiac	4,811		151,388	328,085
Tempest	2,101		78,757	53
Total—General Motors	41,477	5,499	1,767,554	2,316,885
Total—Studebaker-Packard Corp.	2,816	3,047	45,416	81,215
Checker Motors	145	126	4,287	5,508
Total—Passenger Cars	114,593	73,160	3,690,032	4,970,189
TRUCK PRODUCTION				
Chevrolet	6,444	96	234,672	300,862
G. M. C.	1,610	1,157	51,804	85,263
Diamond T	37	45	1,340	2,189
Divco	60	60	1,767	3,096
Dodge and Fargo	1,611	1,645	50,474	55,354
Ford	8,069	7,760	256,449	269,266
F. W. D.	19	26	672	737
International	2,909	2,895	106,818	97,646
Mack	86	244	7,639	11,649
Studebaker	161	311	5,364	10,211
White	264	355	12,534	12,651
Willys	3,107	3,166	87,425	99,824
Other Trucks	85	85	3,231	3,864
Total—Trucks	24,462	17,845	820,189	952,612
Total—Motor Vehicles	139,055	91,005	4,510,221	5,922,801

1961 TRUCK TRAILER SHIPMENTS

Industry Division, Bureau of the Census

Type of Trailer	July	Seven Months 1961	Seven Months 1960
Vans			
Insulated and refrigerated	353	3,129	3,606
Steel	72	363	543
Aluminum	281	2,766	3,063
Furniture	74	792	1,520
Steel	59	616	1,342
Aluminum	15	176	178
All other closed-top	1,791	10,337	16,980
Steel	359	2,225	3,856
Aluminum	1,432	8,112	13,124
Open-top	210	1,376	1,828
Steel	57	544	530
Aluminum	153	832	1,298
Total—Vans	2,428	15,634	23,934
Tanks			
Non- and low-pressure			
Petroleum and aircraft refuelers			
Carbon and alloy steel	74	627	1,000
Stainless steel	11	98	158
Aluminum	97	720	1,123
Total—Petroleum	182	1,445	2,281
Chemical, food, and sanitary	25	341	454
Dry materials	157	1,052	927
High-pressure (LPG, chemicals, etc.)	23	197	228
Total—Tanks	387	3,025	3,890
Pole, pipe, and logging			
Single axle	17	399	148
Tandem axle	34		581
Total	51	399	729
Platforms			
Racks, livestock, and stake	32	243	274
Grain bodies	46	415	821
Flats, all types	501	3,411	5,882
Total—Platforms	579	4,069	6,977
Low-bed heavy haulers	189	1,607	1,285
Dump trailers	163	1,052	1,053
All other trailers	158	1,548	2,118
Total—Complete Trailers	3,955	27,334	39,986
Dump trailer chassis[1]	7	200	597
Trailer chassis only[1]	298	1,636	1,953
Total—Trailers and Chassis	4,260	29,170	42,536
Detachable van bodies[1]	268	1,788	2,067

[1] Sold separately.

NEW PASSENGER CAR REGISTRATIONS BY REGION*

Zone	Region	July 1961	June 1961	July 1960	Seven Months 1961	Seven Months 1960	Per Cent Change: July over June	July over July 1960	Seven Months 1961 over 1960
1	New England	33,091[1]	41,655[1]	32,695	215,627[2]	227,951	−20.56	+ 1.21	− 5.41
2	Middle Atlantic	111,458	117,226	114,018	707,040	779,608	− 4.92	− 2.25	− 9.31
3	South Atlantic	64,013	72,204	65,127	456,844	524,485	−11.34	− 1.71	−12.90
4	East North Central	112,207	133,657	136,240	764,546	1,005,226	−16.05	−17.64	−23.94
5	East South Central	20,887	22,356	24,579	141,540	181,693	− 6.57	−15.02	−22.10
6	West North Central	43,819	61,801	46,104	296,537	324,700	−29.10	− 4.96	− 8.67
7	West South Central	35,850	38,868	45,570	266,303	317,365	− 7.76	−21.33	−16.09
8	Mountain	18,043	18,563	19,692	120,410	135,539	− 2.80	− 8.37	−11.17
9	Pacific	61,678	67,092	62,510	419,652	461,137	− 8.07	− 1.33	− 9.00
	Total—United States	501,046	573,422	546,535	3,388,499	3,957,704	−12.62	− 8.32	−14.38

[1]—Registrations for Connecticut are estimated. [2]—Registrations for Connecticut for April, May, June and July are estimated.

*—Compiled from official state records. Data property of R. L. Polk & Co. May not be copied, sold or reprinted without Polk permission.

States comprising the various regions are: Zone 1—Conn., Me., Mass., N. H., R. I., Vt. Zone 2—N. J., N. Y., Pa. Zone 3—Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va. Zone 4—Ill., Ind., Mich., Ohio, Wis. Zone 5—Ala., Ky., Miss., Tenn. Zone 6—Iowa, Kans., Minn., Mo., Nebr., N. D., S. D., Zone 7—Ark., La., Okla., Tex. Zone 8—Ariz., Colo., Ida. Mont., Nev., N. M., Utah, Wyo. Zone 9—Alas., Cal., H. I., Ore., Wash.

1961 TRUCK FACTORY SALES BY G.V.W.

As reported by the Automobile Manufacturers Association

Period	6,000 lb. and less	6,001-10,000 lb.	10,001-14,000 lb.	14,001-16,000 lb.	16,001-19,500 lb.	19,501-26,000 lb.	26,001-33,000 lb.	Over 33,000 lb.	Total
First Quarter	150,943	43,699	2,631	6,988	31,468	14,856	5,768	7,416	263,769
Second Quarter	178,344	44,789	3,192	7,998	39,586	17,981	7,267	9,931	309,088
Total—Six Months	329,287	88,488	5,823	14,986	71,054	32,837	13,035	17,347	572,857
July	49,762	12,719	1,351	2,933	12,788	6,294	1,998	2,466	90,311
Total—Seven Months—1961	379,049	101,207	7,174	17,919	83,842	39,131	15,033	19,813	663,168
Total—Seven Months—1960	430,966	121,678	7,716	22,519	114,790	47,519	24,203	23,005	792,396

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LIPE DELIVERS IN THE CLUTCH

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Circle 132 on Inquiry Card for more data

MEN IN THE NEWS

Lindberg Engineering Co., Kiln Div.—Elmer W. Edstrand has been promoted to manager.

Federal - Mogul - Bower Bearings, Inc., International Div. — John E. Brennan has been named general manager.

Humble Oil & Refining Co. — Robert O. Goodykoontz has been promoted to vice president in charge of Esso Standard.

Hyster Co.—Philip S. Hill has been elected president.

Fairchild Stratos Corp., Aircraft - Missiles Div. —Walter J. Schafer has been appointed engineering director.

Firestone Tire & Rubber Co.—A. F. Weber (far left) has been promoted to manager of highway truck tire engineering and Melvin P. Hershey has been appointed manager of tire engineering.

Midland-Ross Corp.—**Harry J. Bolwell,** elected to a vice presidency, was named manager of the Surface Combustion Div.

Dana Corp., Parrish Pressed Steel Div.—**Darwin W. Clay** has been promoted to manager of marine products.

Metal & Thermit Corp. — **Leonard W. Mawhinney** has been named president; **R. A. Bernabo** has been promoted to corporate secretary, and **E. J. Robesch** has been appointed assistant controller and assistant secretary.

Clark Equipment Co.—**C. H. King,** vice president, has been named staff officer with responsibilities for engineering and **Ronald H. Bolster** has been promoted to head of engineering and sales, Automotive Div.

Goodyear Aircraft Corp. — **D. P. Barlow** has been appointed manager of the value analysis dept.

Studebaker-Packard Corp. — **Robert K. Robinson** has been promoted to assistant general sales manager.

Willys Motors, Inc. — **James A. Currie** has been promoted to director of corporate planning.

General Motors Corp., Chevrolet Motor Div. — **Lloyd J. Bentley** has been named general superintendent of production in Tonawanda, N. Y.

International Harvester Co., Farm Equipment Div. — **Harlan K. Arp** has been named product supervisor.

Bendix Corp., Bendix Systems Div. — **Louis B. Young** has been named general manager.

Allis-Chalmers Mfg. Co., Research Div. — **Will Mitchell, Jr.,** has been appointed director.

General Motors Corp., Defense Systems Div. — **Dr. Scott C. Daubin** has been appointed head of the marine sciences section, Sea Operations Dept.

United States Rubber Co. — **Edwin D. Meade** has been named director of commercial relations.

Chrysler Corp., Dodge Div.—**David R. Crandall** has been appointed director of truck marketing.

La Salle Steel Co.—**Robert Peterson** has been named manager of steel service center sales.

Chrysler Corp., Export-Import Div. —**Keith P. Mazurek** has been appointed general manager.

Borg - Warner Ltd., Morse Chain Div.—**John R. Mueller** has been promoted to managing director.

Wyman - Gordon Co. — **Federick C. Esty** has been promoted to director of raw materials procurement.

Lockheed Aircraft Corp. — **Courtland S. Gross** has been elected board chairman and **Daniel J. Haughton** has been named president.

Necrology

Charles O. Miller, 75, retired director of purchasing for General Motors Corp., died Sept. 28 in Orchard Lake, Mich.

B. Edwin Hutchinson, 73, an early associate of the late Walter P. Chrysler and retired vice president and treasurer of the Chrysler Corp., died Sept. 27 in Grosse Point, Mich.

Marvin E. Coyle, 73, former executive vice president of General Motors Corp., died Sept. 27 in San Bernardino, Calif.

Charles E. Wilson, 71, former General Motors president and former Secretary of Defense, died Sept. 26 near Baton Rouge, La.

Rowland J. Goldie, 78, a director of Rockwell-Standard Corp. and retired vice president of its predecessor, Timken-Detroit Axle Co., died Sept. 25 in Detroit.

A. Wilbur Mace, 79, former special assistant to the president of United States Steel Corp. who held the same post with Allegheny-Ludlum Steel Co., died Sept 21 in Washington, D. C.

George E. Muma, 66, retired president of the Divco Corp., died Sept. 21 in Detroit.

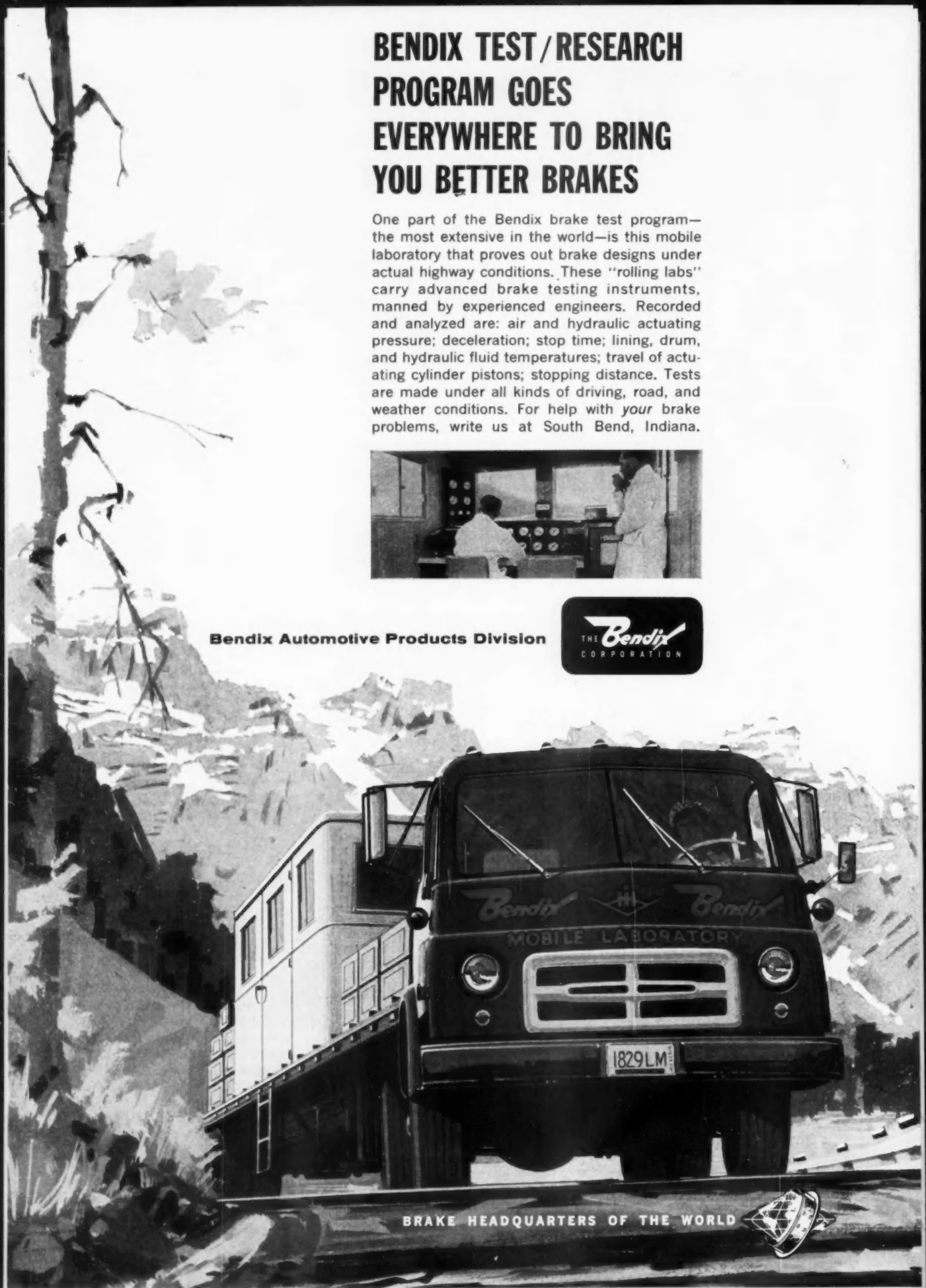
Luther W. Bahney, 82, former director of research of Scovill Mfg. Co., died Sept. 13 in Waterbury, Conn.

BENDIX TEST/RESEARCH PROGRAM GOES EVERYWHERE TO BRING YOU BETTER BRAKES

One part of the Bendix brake test program—the most extensive in the world—is this mobile laboratory that proves out brake designs under actual highway conditions. These "rolling labs" carry advanced brake testing instruments, manned by experienced engineers. Recorded and analyzed are: air and hydraulic actuating pressure; deceleration; stop time; lining, drum, and hydraulic fluid temperatures; travel of actuating cylinder pistons; stopping distance. Tests are made under all kinds of driving, road, and weather conditions. For help with *your* brake problems, write us at South Bend, Indiana.

Bendix Automotive Products Division

THE Bendix CORPORATION



BRAKE HEADQUARTERS OF THE WORLD

an Editorial

Exit— The "Big Finny" Look

THE FINAL QUARTER OF 1961 opened this month with the automotive industries in a strong position. The underlying tone of firm optimism throughout the entire industry reminded old-timers of the advent of excellent selling seasons in previous peak production eras. This year, the industry has much to talk about. There are many new engineering features, many new engines, many new benefits of economy and comfort, style and sheer luxury appeal, to attract buyers to the 1962 models. Retail passenger car and truck dealers have a platform of important new sales points to demonstrate to even the most skeptical buyers. Most importantly, that "big finny" look now is completely passe.

TO CANVASS THE DEALER ATTITUDES, calls were made at random on ten typical dealers, at the time new models were introduced. Last year, during a similar canvass, there were only two salesmen who suggested a "ride or drive" demonstration. This year seven of the 10 salesmen *insisted* on a "ride or drive" test. If such performances continue at the dealer level, it is an indication that retail salesmen are at a peak of enthusiasm about the products they have to sell. Such enthusiasm is a significant barometer. It portends success in 1962.

THROUGHOUT THE INDUSTRY, the addition of refinements of exterior design, interior styling, improvements of quality control and special catering to the tastes of even the most highly segmented portions of the market; have created new sales opportunities which did not exist previously. The swing-back to cars as a status-symbol has begun and will grow.

THIS MONTH WILL BE A PERIOD of intensive comparative shopping by families throughout the land. The high-finned antiques of recent years will be conspicuously obsolete on the highways of the nation when the sleek, powerful and exciting '62's sweep over the roads from coast to coast. As this issue reveals in full color, the industry, as a whole, has created a classic "new look." To be "in-the-mode" with the most appropriate indicators, Mr. and Mrs. America will turn to the new designs as a refreshing symbol of American progress. Remember when the tear-drop shaped bombs were replaced by the new look in 1955? Replacing the "big finny look" will be an even bigger avalanche than "replacing the bombs."

Hartley W Barclay

Editor and Publisher

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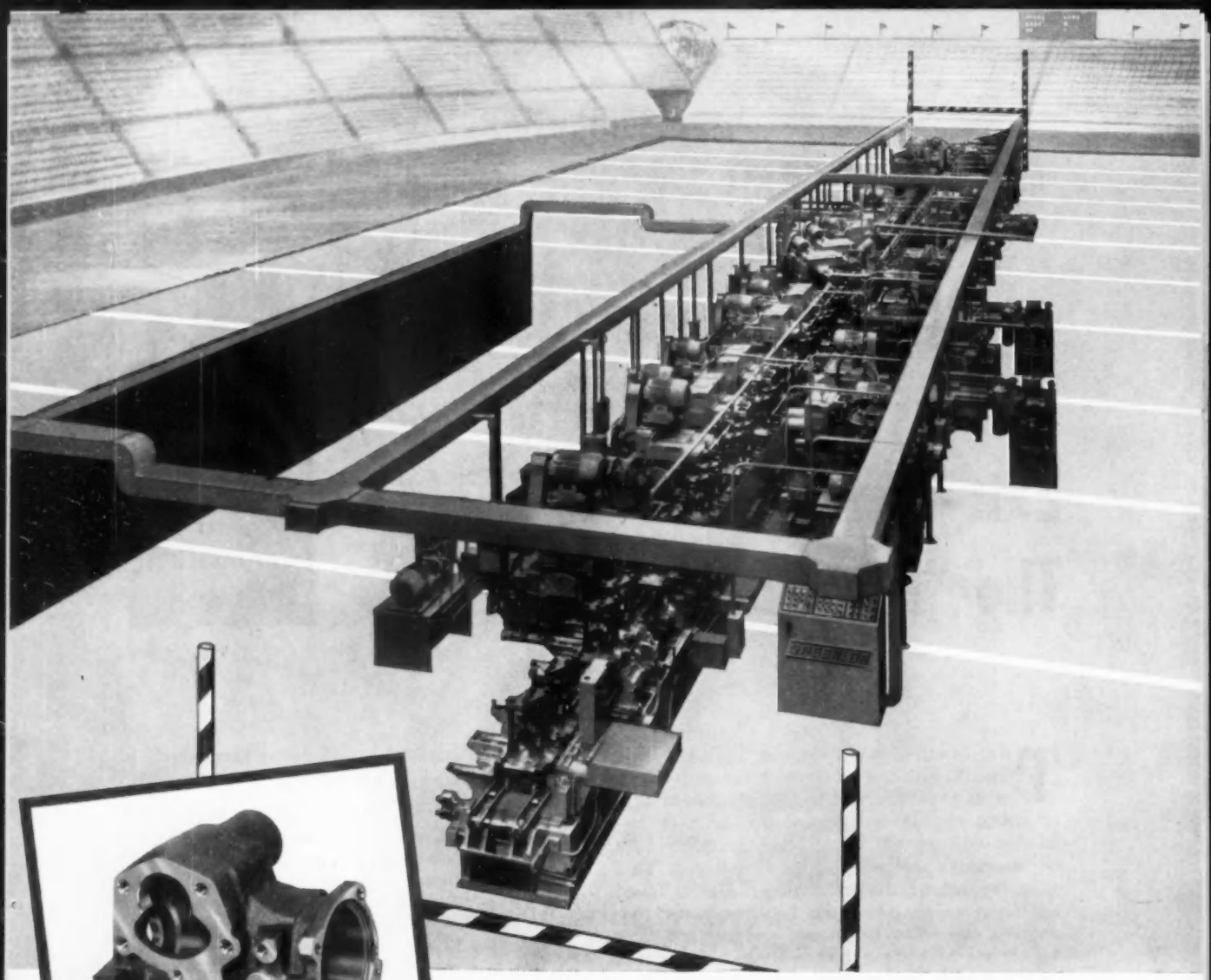

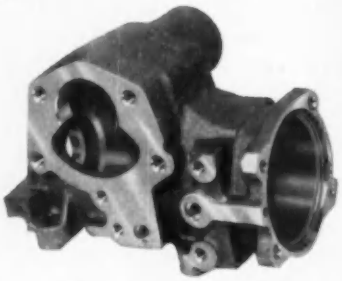

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GEAR HOUSING

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30 - Boring
40 - Drilling
4 - Recessing
24 - Chamfering
24 - Tapping
32 - Checking

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Greenlee's manufacturing facilities have expanded to keep pace with customer requirements for mechanized production equipment. Complete transfer machines are production proven on our assembly floor before delivery. Test runs are made with coolant supplied from a central system built into the assembly floor. Actual production is simulated except that test run parts are subjected to 100% inspection . . . customer changes are made more readily and economically. This careful testing and thorough inspection pays off after installation . . . gets you into full production faster. Let a Greenlee representative give you the facts and figures.

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GREENLEE BROS. & CO. 1928 MASON AVE. ROCKFORD, ILLINOIS

Ed: This looks good to me - let's discuss it - J.B.

Dodge spends the money where you can see it.

The 1962 NEW CAR SHOW

DODGE
POLARA "500"

DODGE'S completely new Polara "500" is a limited-production luxury sports model that is offered as a two-door hardtop or a convertible. Mounted on a 116 in. wheelbase, it features bucket seats and a console.

Standard engine is a 305 hp, 361 cu-in. V-8 with special camshaft, four-barrel carburetor and dual exhaust. Engineering advances include a more compact automatic transmission, a forced-air heating and ventilating system, long-life chassis lubrication, self-adjusting brakes and a new starting motor. Full unit-construction, Torsion-Aire ride and Dodge's seven-step, dip-spray corrosion protection process have been retained.

The interior and exterior of the Polara "500" are color matched. All-vinyl interior trim and wide use of a special beige color highlight all five exterior colors.

Styling reflects the European theme of long hoodline and close-coupled rear quarter, and emphasizes design balance of performance and handling.

Redesigned automatic transmission has provision for a parking sprag controlled from the instrument panel. An 11¾ in. diameter torque converter is connected to the crankshaft flange by flexible drive plate. The front pump now is driven directly by the impeller hub. Case is aluminum.

Chevrolet puts one right in the middle . . .

CHEVROLET

CHEVY II

BIG news from Chevrolet is the Chevy II. The newest member of the family is mounted on a 110 in. wheelbase which puts it between the Corvair and the standard size Chevrolet.

With three series designations, the "100," "200" and "Nova 400," the new entry offers a wide choice of models—two and four-door sedans, four-door station wagons, a two-door sport coupe, and a two-door convertible.

The buyer has a choice of two engines, also brand new—a 153 cu-in. four cylinder ("Super-Thrift") rated 90 hp at 4000 rpm, and a 194 cu-in. six cylinder ("Hi-Thrift") rated 120 hp at 4400 rpm. Both have a compression ratio of 8.5:1 and feature single-barrel carburetors and hydraulic lifters. The four cylinder has five main bearings, and the six cylinder has seven. Combustion chamber geometry is a "modified wedge" configuration. Pistons are of cast aluminum.

A three-speed manual transmission (2.94:1 Low) is standard, although automatic Power-Glide is optional with either engine. Both optional and Positraction axle ratios are available for Chevy II models.

The front suspension system is conventional independent design of high-mounted coil springs. The rear suspension, however, is unique in using special single-leaf springs. The system consists of leaf springs, diagonally-mounted shock absorbers, compression type rear shackles, and an unusual axle mounting arrangement that sandwiches the center of the spring leaf between heavy rubber pads. Berlin-type spring eyes with large rubber bushings also contribute to the reduction of noise and vibration.

The new leaf spring is a five-foot steel bar, shot-peened for increased durability. Variations in thickness and width provide uniform stress distribution. Maximum stress level is 25 per cent over multi-leaf springs.

The new line has integral body and frame construction. Unitized front end structure has bolt-on fenders.

Buyer has choice of 14 exterior colors with color-keyed interiors. Complete line of comfort and safety options is available, including power steering and power brakes.

. . . and Ford does the same.

FORD

FAIRLANE

ALTHOUGH the name is the same, the 1962 Ford Fairlane is an entirely new product. Mounted on a 115.5 in. wheelbase, its size and price place it between the Falcon and the Galaxie.

With clean, crisp lines, the Fairlane and Fairlane 500 are available in both two and four-door sedans. Standard engine is a 170 cu-in. straight six. An optional 221 cu-in. cast iron overhead valve V-8 weighs only 450 lb dry.

A two-speed automatic transmission is optional with both engines. Overdrive, is available only with the V-8.

The all-new series also boasts a 6000 mile crankcase oil interval, 30,000 mile chassis lube period, and an all-season cooling system good for 30,000 miles.

Unitized body employs galvanized steel members in the underbody region coupled with liberal amount of Zincilate zinc-rich primer in other areas such as large panels, inner rocker panel, and quarter panel joints and welds. Body structure also features four "torque" boxes to absorb shock, vibration.

Plymouth makes a big, new change . . .

PLYMOUTH

. . . Valiant, a small, new Hardtop.

VALIANT

HANDSOME styling and a long list of mechanical improvements are among the new features of the 1962 Plymouth. Twenty-three models are available in three series: Savoy, Belvedere and Fury. The new "stable" includes 10 sedans, 5 hardtops, 1 convertible, and 7 station wagons all mounted on a 116 in. wheelbase. Engines range from the standard Slant Six to an optional 361 cu-in. V-8 with walloping performance.

New three-speed automatic transmission for V-8 models is 60 lb lighter with 10 per cent more torque capacity. Manual 6 cylinder transmission features increased low gear ratio at 2.95 to 1 for improved breakaway and hill-climb performance.

The Valiant Signet 200, a highly styled sports hardtop with bucket seats, sparks the new Valiant line-up. Standard 170 cu-in. six cylinder engine is retained; 225 cu-in. aluminum block is optional. Engineering advances include aluminized steel headers and muffler shell, bonded brake linings, and a printed circuit instrument assembly.

Dart could go all the way this year . . .

DODGE
DART

. . . and bring Lancer right along with it.

DODGE
LANCER

RESTYLED Dodge Darts carry new series identification—Dart 330 and 440, which embrace 23 models. Luxury 440 series has individual seats and bolsters, and pull-down arm rest for front seat. Standard engines are the 230 hp, 318 cu-in. V-8, and the 145 hp, 225 cu-in. Slant Six. Both use regular gas. A 260 hp V-8 power package with 4-barrel carburetion and dual exhausts is optional. "Hot" 305 hp is also available as an option.

Other features include smaller and lighter automatic transmissions, torque converters and housings; new axle ratio with 6 cylinder engine and automatic transmission, a heater system employing an axial blower, and an aircraft-type throttle linkage.

Dodge Lancer introduces a plush new two-door hardtop, the Grand Turismo. New GT series sports bucket seats and an all vinyl interior. Series 170 and 770 offer two and four-door sedans and four-door station wagons. Front suspension, engine mounts, exhaust system and carburetion have all been improved on these models for '62.

Pontiac adds some length . . .

PONTIAC
BONNEVILLE

THE Pontiac Catalina, Bonneville and Starchief are slightly longer for '62—wheelbase for the Catalina is up an inch. Basic engine of all series is the 389 cu-in. V-8. Compression ratios range from 8.6:1 to 10.75:1—horsepower from 215 at 3600 rpm to 348 at 4800 rpm. Chassis lubrication interval is up to 35,000 miles; rear axle and manual transmission lube is good for life of the car. Hydramatic fluid changes are now on 25,000 mile interval, crankcase oil drain on 4000 mile schedule. One piece aluminum hub, drum and wheel, pioneered by Pontiac, continue as optional feature.

The Tempest line now offers five models including a new convertible. Basic engine remains the 195 cu-in. four cylinder inline with wide range of power options. Optional 215 cu-in. aluminum V-8 is continued with a rating of 185 hp with four-barrel carb. Distributor, rear axle, and all transmissions are lubed for the life of the car.

PONTIAC
TEMPEST

. . . and Tempest adds a model.

The Hawk's European flavor . . .

STUDEBAKER
HAWK

. . . is reflected in the Lark's new grille.

STUDEBAKER
LARK

RICHLY restyled from the Hawk, the "Gran Tourismo" is Studebaker's plush new sports-hardtop. With bucket seats, a simulated wood grained instrument panel, and an optional four-speed, floor-mounted stick shift, it "looks" performance. Overall dimensions remain the same. The 289 cu-in. V-8 is carried over with the exception of a reduction in compression ratio—8.5:1.

The longer and lower Larks are mounted on new wheelbases—109 in. for the two-door sedans, hardtop and convertible; 113 in. for the four-door sedan, Cruiser and wagon.

Both the 170 cu-in. six cylinder and the 259 cu-in. V-8 incorporate new engineering refinements. Compression ratio for the six: 8:1 standard; 8.5:1 optional. For the V-8: 8.25:1 standard; 8.5:1 and 7.5:1 (with heavier gasket) optional.

Performance buffs will like new Lark Daytona hardtop and convertible with optional 289 cu-in. V-8 and bucket seats.

Although Rambler's American has the "E-Stick" all to itself . . .

RAMBLER
AMERICAN

RAMBLER
CLASSIC

. . . The Double-Safety brake system is standard for all series . . .

RAMBLER
AMBASSADOR

BIG news in the Rambler American is the "E-Stick" automatic clutch transmission that eliminates the clutch pedal. Driver simply uses stick shift without attendant clutching action.

Also significant is the all-new Double-Safety brake system which is standard on all series. Tandem master cylinder provides separate hydraulic system for front and rear brakes.

Both Ambassador V-8 and Classic Six offer three model lines—Deluxe, Custom and top-of-the-line "400" on which bucket seats are extra-cost items. Both series boost chassis lubrication intervals to 30,000 miles—engine oil to 4000 miles.

Ambassador, nine inches shorter, now has same wheelbase as Classic Six series.

. . . And the Classic and Ambassador share a wheelbase.

See the U.S.A. from a big one . . .

CHEVROLET

IMPALA

CHEVROLET

CORVAIR

. . . or a little one,

CHEVROLET

CORVETTE

. . . or a bucket seat.

ALTHOUGH the Chevrolet Biscayne, Bel Air and Impala chassis remains the same, a new 327 cu-in. V-8 with matched Powerglide is offered. The familiar 348 cu-in. V-8 and Turboglide transmission are discontinued. Total number of models is down from 20 to 14.

The Corvair, with the exception of special identification hardware, remains basically unchanged. Lakewood station wagon and four-door sedan have been discontinued in the 500 series.

Corvette has new grille and side cove styling. New 327 cu-in. engine becomes basis for all power team equipment. Horsepower ranges from 250 at 4400 rpm with 4 barrel carbs to 360 at 6000 rpm with fuel injection, special cam and mechanical lifters.

There's not much point in changing a winner . . .

FORD
GALAXIE

. . . except, maybe to add a little glamour . . .

POPULAR Thunderbird holds the size and styling introduced in '61. New high performance distributor, improved rear suspension, additional insulation and extended lubrication periods add up to performance bonus.

The high-style Ford Galaxie employs new mechanically silent lash rocker arm system in the 223 cu-in. Six. Three and four-speed transmissions are much improved.

Falcon, Ford's big seller, boasts three new models—Falcon Squire, Station Bus and Club Wagon. The 170 cu-in. Six is optional.

Ford "family" now has 6000 mile crankcase oil change interval, 30,000 mile chassis lube period, and new coolant.

FORD
FALCON

FORD
THUNDERBIRD

. . . or improve the performance for that special buyer.

IMPERIAL

Imperial's modified fin . . .

CHRYSLER'S prestige Imperial is tastefully restyled with a new two-piece grille, rear quarter and trim. The standard 413 cu-in. V-8 with four barrel carburetor has redesigned camshaft and valve-train. Torque-Flite transmission is 60 lb lighter. Single exhaust system replaces duals previously used (except convertible). Chassis lube fittings are removed from all points on front ball joints and steering linkage.

The Chrysler 300 is an entirely new series priced between the Newport and New Yorker models. Standard engine for the series is a 383 cu-in. V-8 with dual carburetor. Torque-Flite is optional. Manual shift is floor mounted. Performance options include big 413 cu-in. V-8 with dual exhausts or 2 four-barrel carbs and special camshaft.

Low-priced Newport has 361 cu-in. V-8 with dual carb. Performing 300-H and New Yorker are retained.

CHRYSLER

NEWPORT

. . . no longer evident in the brand new 300,

CHRYSLER

300

. . . or the lower priced Newport.

OLDSMOBILE

STARFIRE

For Oldsmobile's new, high-styled Starfire coupe, front bucket seats and a sports type tower console . . .

TWO new models highlight the '62 Oldsmobiles—the 98 Holiday Sport Sedan, and the Starfire Coupe. Four series offer a choice of seventeen body styles. Series 88 is mounted on a 123 in. wheelbase, while the 98 Series is 126 in.

All chassis lubrication points are now factory sealed for lifetime lubrication. Generator and distributor are also lube free and engine oil change intervals are extended to 4000 miles. Choice of engines range from 280 hp V-8 (Dynamic 88) to big 345 hp mill in Starfire. Special 260 hp Rocket with 8.75:1 compression ratio is available for use with regular grade fuel.

The F-85 series for '62 offers two new models—the standard Sports Convertible and the Cutlass Sports Convertible. The Cutlass carries bucket seats, morocceen interiors, and the "performance" 215 cu-in., 185 hp aluminum V-8 engine as standard equipment. Standard engine for the line is the 155 hp unit. Both three-speed syncromesh transmission and optional Hydramatic are available.

Line-up now includes 4-dr sedans, 4-dr station wagons in two and three-seat versions, a 2-dr pillar coupe and two convertibles. Extra-cost options include power steering and air conditioning.

OLDSMOBILE

F-85

. . . For the F-85 series, two new sports convertibles—the Cutlass featuring morocceen interiors and a high-performance engine.

BUICK

LE SABRE

One of the models that Buick lopped off the top of the line . . .

BUICK

SPECIAL

. . . was added to the bottom.

RESTYLED with a lean look, the Buick LeSabre, Invicta and Electra (now Electra 225) series have been retained for 1962. Gone, however, are the LeSabre convertible and Estate Wagon. In the Invicta series, the coupe has been dropped and a three-seat Estate Wagon added.

The basic 401 cu-in. V-8 engine is now standard across the board. LeSabre gets the 280 hp version with a two-barrel carburetor, and the Invicta and Electra 225 models have 325 hp mill with a four-barrel carburetor. LeSabre also has an optional economy engine for use with regular grade gasoline.

Engines are shifted 4 in. forward to lower front floor pan. Engine weight now totals only 638 lb dry due to reduced wall thickness of cast iron parts and more use of aluminum (25 lb). Turbine drive and aluminum brake drums are standard equipment.

Dramatic feature of the new Buick Special is the debut of the 135 hp, 198 cu-in. 90 deg. V-6 engine which is standard equipment in the Standard Special series. The Deluxe Special series gets last year's 155 hp aluminum V-8, and the Skylark has the "performance" version — 185 hp with four-barrel carburetor.

All new convertible in Standard and Special series and pillarless Skylark sport coupe also bow this year.

LINCOLN

CONTINENTAL

In this branch of the Ford Family, the built-in luxury, reliability, and styling are continued without major change. Refinements and detail improvements describe the '62 Lincoln . . .

MERCURY

MONTEREY

. . . Monterey's new Custom Series leads the Mercury line for 1962, where passenger comfort is assured with "cushion-link" suspension and a sound-insulation package . . .

COMET

The nine models in the Comet line contain many of the engineering features of their "big brothers" . . . and will ride on two-ply tires.

EVOLUTIONARY, rather than revolutionary changes mark the new Lincoln, Mercury and Comet models. Improvements in suspension, lubrication, engines and transmissions forecast significant increases in value, performance and reliability.

Major changes in the classic, yet handsomely styled Continental further refine already generous doses of quality. The Mercury introduces a new Monterey Custom series and is longer this year. The highly successful Comet features a new light-weight cast iron engine and an improved transmission.

For Cadillac . . . triple brakes and four windows.

CADILLAC

SUBTLE styling changes and significant advances in safety and engineering speak eloquently in the 1962 Cadillac.

A shortened body shell that reduces overall length from 222 in. to 215 in. makes its appearance on the Series 62 Town Sedan and Sedan de Ville.

The thoroughly proven 390 cu-in. V-8 and Hydramatic drive are carried over without major change.

Meaningful contribution to safety is the industry's first triple brake system which employs a dual power brake master cylinder. A separate piston and fluid reservoir is provided for both front and rear wheels. Parking brake can also be used in emergency since it will not lock, after actuation, while the car is in gear.

New cornering light system is another feature. Automatically actuated when lights are on and turn signal used, fender-mounted lamps illuminate the turning area.

Cadillac continues to provide a lube-free chassis, and the normal oil drain period for the Hydramatic is at 16,000 mile intervals. Above freezing, engine oil change is set at 4000 miles or 60 days.

All models are mounted on a wheelbase of 129.5 in., except for the Fleetwood 75 series which is 149.8 in.

Everything's changed but the name on the bearings

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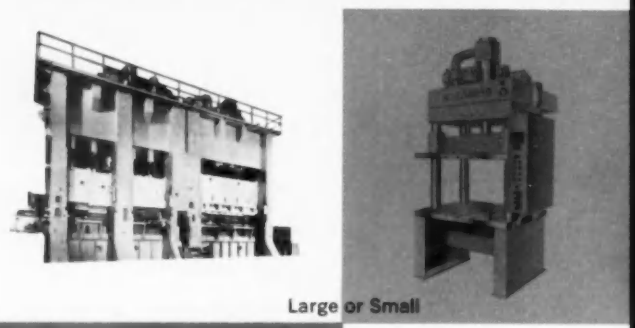

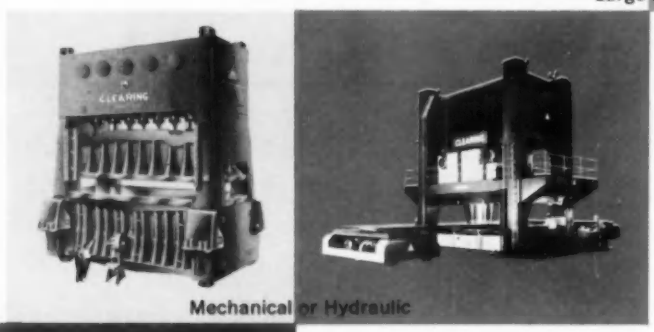

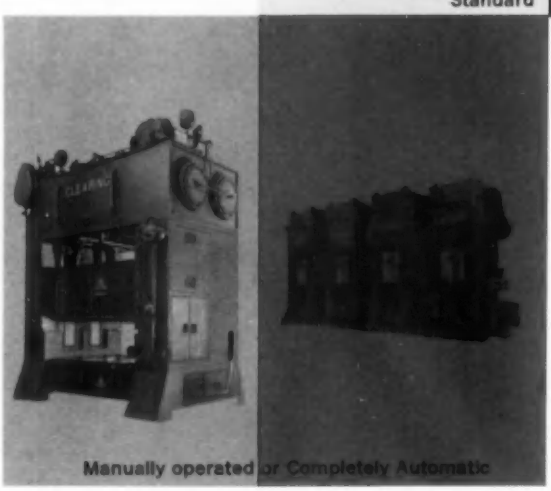

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DIVISION OF U. S. INDUSTRIES, INC.
6499 W. 65th Street • Chicago 38, Illinois

1962 two-door Thunderbird hardtop

The New Thunderbird

ALTHOUGH the popular Thunderbird retains the physical size and styling features in the 1962 version, it incorporates many styling and design detail improvements.

Mounted on a wheelbase of 113.2 in., the Thunderbird is available, as before, in a two-door hardtop and a two-door convertible. The basic engine remains—a 390-cu in. displacement V-8, rated 300-bhp at 4600 rpm. All standard equipment items, too, are the same as last year with the addition of seat belt anchors. The closed crankcase ventilation system is standard.

One of the major changes in the engine is in the elimination of the exhaust heat riser valve. This is replaced by an aluminum, water-heated spacer between the manifold and carburetor, designed to maintain uniform temperature of the mixture and minimum vaporization at the carburetor throat. In addition, the crossover from the exhaust system now provides pulse heat only, thus reducing exhaust system back pressure. The induction system also includes a new, easier breathing intake manifold.

Another improvement is the introduction of a distributor designed specifically for Thunderbird, embodying an advance curve tailored for this high performance car.

The engine is fitted with the 30,000-mile disposable fuel filter; and provides 30,000-mile, all-weather coolant.

Dual range Cruise-O-Matic is standard equipment and embodies some improvements. One of these is a new oil cooler, said to increase cooling by some 50 per cent. In addition, there is a larger capacity transmission pump and better oil sealing.

The rear suspension and rear axle also have been treated to changes. Front spring eyes of the 60-in. rear leaf spring are isolated by a larger, resilient rubber bushing which allows for fore-and-aft motion of the axle. Additional isolation from road shock comes from the introduction of a new method of mounting the spring to the axle. This consists of a two-piece metal box for housing the upper and lower butyl pads and the spring in between. This has the effect of controlling the compression applied at assembly.

The brake system has been improved in detail. Brake drums now are annealed to eliminate locked-up stress and thus to provide more dimensional stability and freedom from warping when hot. Exterior cooling grooves retard brake fading. The brake pads on which the shoe edges rest are chromium-plated for smoother operation and extended life.

The standard integral type power steering system embodies changes to reduce parking effort. Effort on the rim of the steering wheel now is down to two pounds.

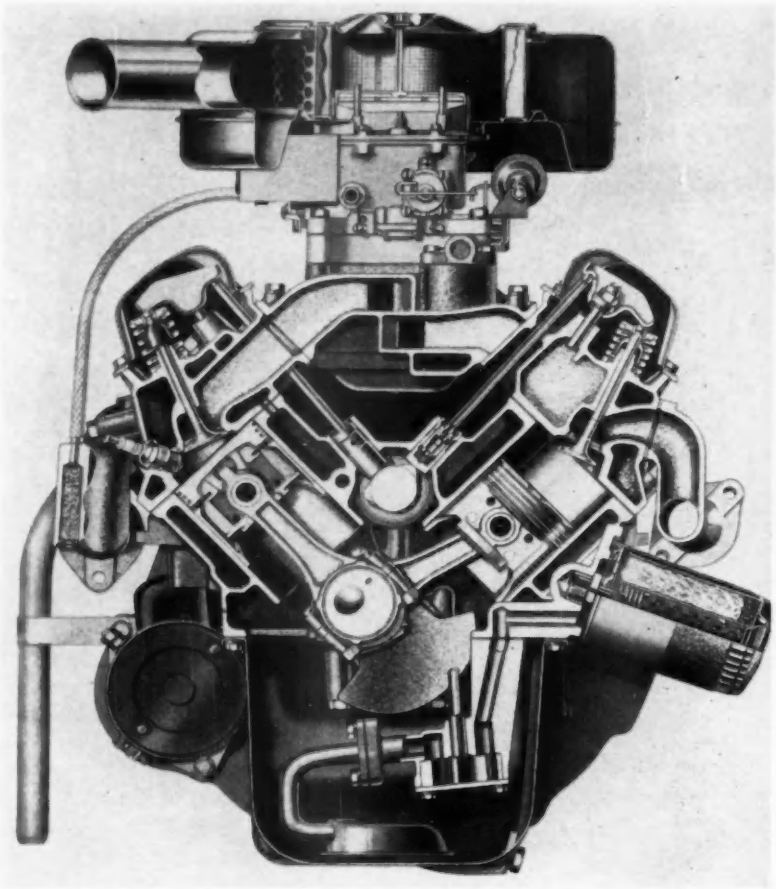
A special mounting is provided for the dual exhaust system. An element quite similar to a motor mount, it serves to hold the exhaust system accurately in place, while at the same time providing a resilient mounting. The exhaust system employs aluminized resonators and rear-mounted, combination aluminized and stainless steel mufflers.

The optional air conditioning system embodies an improved clutch mechanism and a sturdier mounting.

Although the body structure remains the same to the casual eye, it is noteworthy that about 60 lb of steel has been added in the form of brackets and other reinforce-

(*Turn to page* 128, *please*)

← Circle 135 on Inquiry Card for more data



Front cross section of the 1962 Fairlane 221 cu-in., V-8 engine

The All-New Ford Fairlane

THE name's the same—but the car is entirely different. That's the story of the 1962 Ford Fairlane. Mounted on a wheelbase of 115.5-in. featuring a unitized body of unusual structural design, the Fairlane fits between the Falcon and Galaxie in size and price.

This line will be offered in two series—Fairlane and Fairlane 500—each one available in two-door and four-door sedan models. Two powerplants are available—the regular 170-cu in. six-cylinder engine; and the optional 221-cu in. lightweight cast iron V-8. The three-speed manual transmission is standard with both engines; the two-speed automatic transmission is optional with both engines; overdrive is offered, in addition, only with the V-8.

As on all other cars in the Ford family, Fairlane features the 6000-mile crankcase oil change period; the 30,000-mile chassis lubrication interval; and the new 30,000-mile all-season cooling system.

ENGINE—The new 221-cu in. V-8 is the first of the Ford family of V-8 engines to be produced by the advanced foundry techniques (see AI, July 1, 1961) which make possible the development of thin-wall construction, only 3/32-in. in some areas, resulting in a dry weight of 450 lb.

Of overhead valve design, it employs a non-directed exhaust-heated induction system. Other features include hydraulic valve lifters, high-mounted generator, automatic choke, die-cast aluminum front cover. It is designed to operate on regular grade gasolines.

The cast iron cylinder heads incorporate a wedge-type combustion chamber, located centrally over the bore. With the spark plug thus located to best advantage, the engine produces increased combustion efficiency.

The valve arrangement is such that no two exhaust valves are adjacent, thus improving combustion chamber cooling and cylinder head gasket durability. Intake valves are of a special chromiun-magnesium-nickel alloy, while exhaust valves are of austenitic steel alloy.

The high-torque camshaft is cast from special alloy iron, with process-hardened cam surfaces. Camshaft lobes are slightly tapered, and

(*Turn to page* 118, *please*)

The new Fairlane 500 four-door sedan

The

1962

Rambler Classic two-door sedan

Rambler Classic Six and Ambassador V-8 Models

THREE model lines are available in 1962 in both the Ambassador and Classic series. They are the Deluxe, the lowest-priced models; the Custom line, which replaces the Super designation but retains many of the features of last year's Custom at a lower price, and the 400, the top-of-the-line series on which bucket seats are offered as an option.

An addition to the Classic Six series for 1962 is a two-door sedan available in all three model lines. Classics formerly were available only in four-door models.

The Classic Six series is available in 10 models, including two and four-door sedans, four-door station wagons, and the five-door, three-seat wagon. The Ambassador V-8 includes five models in four-door sedans, four-door station wagons and a three-seat wagon.

A new automatic transmission for the classic is more compact and better suited to the power and torque of the six-cylinder engine. The new torque converter has less hydraulic spin loss.

The die-cast aluminum block on the Classic Six engine will be standard on the 400 models and optional on the Custom and Deluxe models. Its aluminum block is 80 lb lighter than the cast-iron block.

The Classic Six overhead-valve engine develops 127-hp with a 138-hp option available. The Ambassador V-8 is rated at 250 hp with a 270-hp version offered as optional equipment.

Front suspension and steering on both the Ambassador and Classic models has been redesigned. The long coil springs are retained for a soft ride, but a new single lower control arm and rod provide more stability on turns. This new front suspension design is said to minimize "body lean" while cornering. In addition, the Ambassador has a sway-stabilizer torsion bar because of the greater weight of the V-8 engine.

Road clearance has been increased to seven inches, an increase of 27 per cent.

Another Rambler "first" is the front passenger seat which has a hydraulic pump beneath it so that the seat cushion can be elevated to any desired height. Offered in combination with individual or bucket reclining seats, this Lounge Tilt Seat and headrest option allows the

(*Turn to page* 146, *please*)

Engine Specifications
1962 Rambler Classic Six

Type	In-Line Six, Overhead Valve
Bore and Stroke	3 1/8 in. x 4 1/4 in.
Displacement	195.6 cu in.
* Block Construction	Aluminum or Cast-Iron
Compression Ratio, Fuel	8.7:1, Regular
Max. Brake Horsepower	127 @ 4200 rpm; 138 @ 4500 rpm opt.
Max. Torque	180 @ 1600 rpm; 185 @ 1800 rpm opt.
Manual Trans. Carburetor (Downdraft)	Single-Barrel Holley, Twin-Barrel Carter opt.
Auto. Trans. Carburetor (Downdraft)	Single-Barrel Carter, Twin-Barrel Carter opt.
No. of Main Bearings	Four
Oil Filter	Full-Flow, Alum. Ang.: Partial-Flow, Cast-Iron Eng.

* Aluminum Standard on 400, opt. on Deluxe and Custom.
Cast-Iron Standard on Deluxe and Custom, no-cost opt. on 400.

Engine Specifications
1962 Rambler Ambassador V-8

	Standard	Optional
Type	V-8 (90°-V)	V-8 (90°-V)
Cylinder Arrangement	Overhead Valve	Overhead Valve
Bore and Stroke	4 in. x 3 1/4 in.	4 in. x 3 1/4 in.
Displacement	327 cu in.	327 cu in.
Compression Ratio, Fuel	8.7:1, Regular	9.7:1, Premium
Max. Brake Horsepower	250 @ 4700 rpm	270 @ 4700 rpm
Max. Torque	340 @ 2600 rpm	360 @ 2600 rpm
Type of Carburetor (Downdraft)	Two-Barrel Holley	Four-Barrel Holley
No. of Main Bearings	Five	Five
Oil Filter	Full-Flow	Full-Flow

Solving your problems

is a "specialty of the house" at Sealed Power

Oil consumption, bore finish, special rings . . . if you have a problem that has to do with engines bring it to Sealed Power.

Here in Sealed Power's spacious, elaborately equipped Research Center is a staff of skilled engine specialists . . . engineers, metallurgists, chemists. They are yours for the asking.

Following a coats-off discussion among this group, knotty problems have a way of being translated into specific means and methods of making engines act *right*.

After all, this is the group that developed Sealed Power's Stainless Steel oil ring . . . the ring that made automotive history because it licked the oil control problem in high compression engines.

Sealed Power PREFERRED PERFORMANCE

PISTONS • PISTON RINGS • SLEEVES • SLEEVE ASSEMBLIES • PRECISION CASTINGS
SEALING RINGS FOR ALL APPLICATIONS

SEALED POWER CORPORATION, MUSKEGON, MICHIGAN • ST. JOHNS, MICHIGAN • ROCHESTER, INDIANA • STRATFORD, ONTARIO • DETROIT OFFICE, 17600 WEST 8 MILE ROAD—PHONE 357-4141

Circle 143 on Inquiry Card for more data

Preview of the 1961 DETROIT METAL SHOW

SHOW HOURS

Monday, October 23
10:00 a.m. to 6:00 p.m.

Tuesday, October 24
10:00 a.m. to 9:30 p.m.

Wednesday, October 25
10:00 a.m. to 9:30 p.m.

Thursday, October 26
10:00 a.m. to 6:00 p.m.

Friday, October 27
10:00 a.m. to 5:00 p.m.

Cobo Hall, Detroit
OCTOBER 23-27

By C. J. Kelly, Assistant Editor

THE most advanced technological developments in new engineering materials and processes will be seen and discussed at the 43rd National Metal Congress and Exposition to be held in Cobo Hall, Detroit, Oct. 23-27. This event, sponsored by the American Society for Metals, will feature 275 exhibits and more than 200 technical papers.

Over 30,000 executives, engineers and technical people have sent registration forms and have received informa-badges. The 275 exhibits, representing products of 325 companies, will contain in excess of 5 million dollars worth of materials and equipment. The ASM has urged the companies exhibiting their wares to staff their displays with engineering experts who are able to demonstrate new processes, answer specific technical questions and help solve the visitors' individual material problems.

MATERIALS APPLICATION CENTER

The ASM's Materials Application Center will house a presentation of seven groups of engineering materials for comparison as to more than six specific properties. Numerous sample parts, components and test specimens will be brought together under the 30-ft arches of the Metal Show Quadrilion. Each material group will have its own pavilion extending from the Quadrilion.

As visitors proceed through the pavilions, they will see what each material group has to offer in specific properties categories, and can compare all the materials groups for specific properties to meet individual requirements. The girders will be color coded for each pavilion.

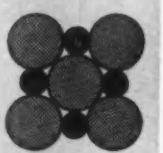
Materials groups include: Wrought Ferrous, Wrought Nonferrous, Cast Ferrous, Cast Nonferrous, Special Purpose, Nonmetalic and Composite.

Properties Categories are: Strength, High Temperature, Corrosion Resistance (Atmospheric). Corrosion resistance (Processing), Fatigue, Low Temperature and General. ■

ASM Metalworking Category Symbols

Steel

Nonferrous



Nonmetallic

Nuclear

SOCIETIES AND ORGANIZATIONS PRESENTING TECHNICAL SESSIONS DURING THE METAL SHOW

American Society for Metals
Metallurgical Society of the American Institute of Mining Metallurgical and Petroleum Engineers
Society for Nondestructive Testing
American Welding Society
American Gas Association
Industrial Heating Equipment Association
Metal Powder Industries Federation
Metal Treating Institute
Special Libraries Association
Ultrasonic Manufacturers Association

Preview of the 1961 DETROIT METAL SHOW

Gaging System

A NEW system has been developed for accurate setting of gages. Called the Micro-Set gaging system,

the device consists of a 1¼ in. quick change holder with Micro-Set gaging that allows the operator to make back and end gage settings directly to thousandths.

The features that allow for fast and accurate gage settings are dial indicator assemblies and Micro-bars which are mounted directly to the holder base and the back gage bar. Spring loaded indicator carriage and plunger provide sensitivity and "feel" in gage settings, and virtually eliminate any possibility of error, since the least variation is immediately evident on the face of the dial—and corrected. *Wales Strippit Inc.*
Booth 130

Circle 45 on Inquiry Card for more data

Electric Furnace

POSITIVE, protective atmosphere for high carbon high chrome and high speed steels is created within this new unit. The manufacturer reports this is possible through the use of Diamond Blocks. No external atmosphere generating equipment is required. This simple, effective atmosphere requires no special adjustment. Tools can be "soaked" in this unit with no danger of surface deterioration. Visitors are invited to bring samples of their high speed steel tools for on-the-spot demonstration hardening. *The Sentry Co.*
Booth 930

Circle 46 on Inquiry Card for more data

Unit Utilizes All Semi-Automatic Welding Processes

A new multiple process semi-automatic welder, called the Multi-Wire, is a combination welder and matched wire feeder which will utilize all of the new semi-automatic welding processes. A family of welding guns has been developed for each of these processes. When changing from one process to another, it is merely necessary to attach the proper gun and cable assembly, and install the appropriate drive rolls and wire guides. Hobart Brothers Co.
Booth 720

Circle 48 on Inquiry Card for more data

New Spray Booths

THIS is the new Dispo paint spray booth that will be shown along with an array of industrial finishing equipment. Included in this display are spray guns, material handling pumps, stand pipes, automatic finishing machines controlled by memory timers, and air supply fans.

The latest in multiple component plastic spray and pour equipment, and fiberglass reinforced plastic spray guns will also be shown. *Binks Mfg. Co.*
Booth 138

Circle 47 on Inquiry Card for more data

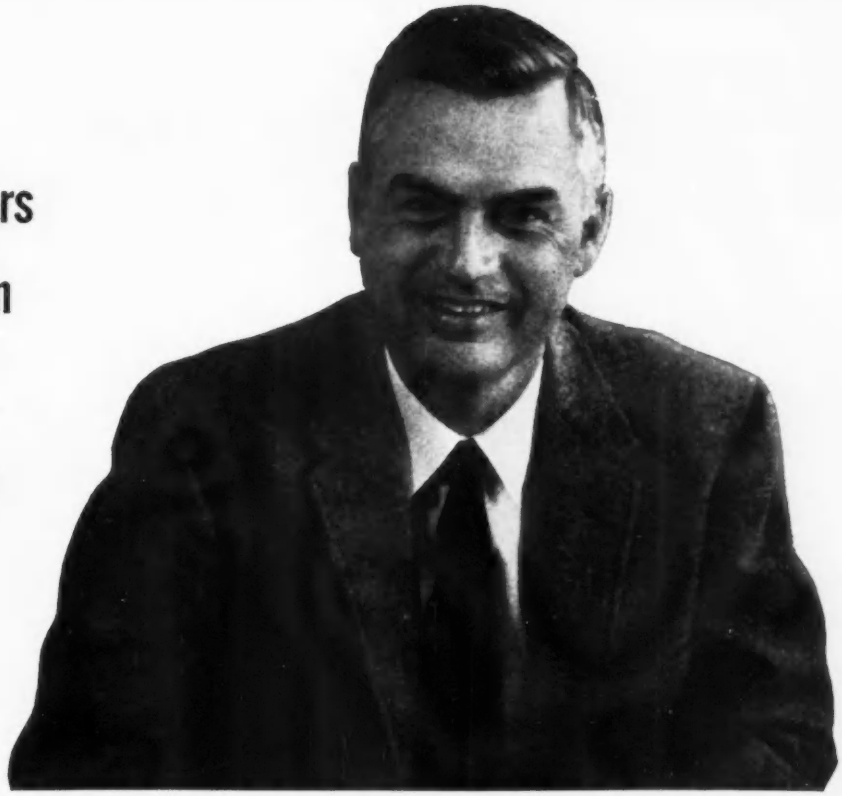
Molten-Salt Bath Process

A METAL treating process called Tuffride is applied to mild, stainless alloy steels and cast iron to produce tough wear resistant surfaces as well as to increase the fatigue strength of the material. This process, in addition to an X-ray diffraction unit for non-destructive testing and visual displays, will be featured by the *Kolene Corp.*

Circle 49 on Inquiry Card for more data

(*Turn to page* 87, *please*)

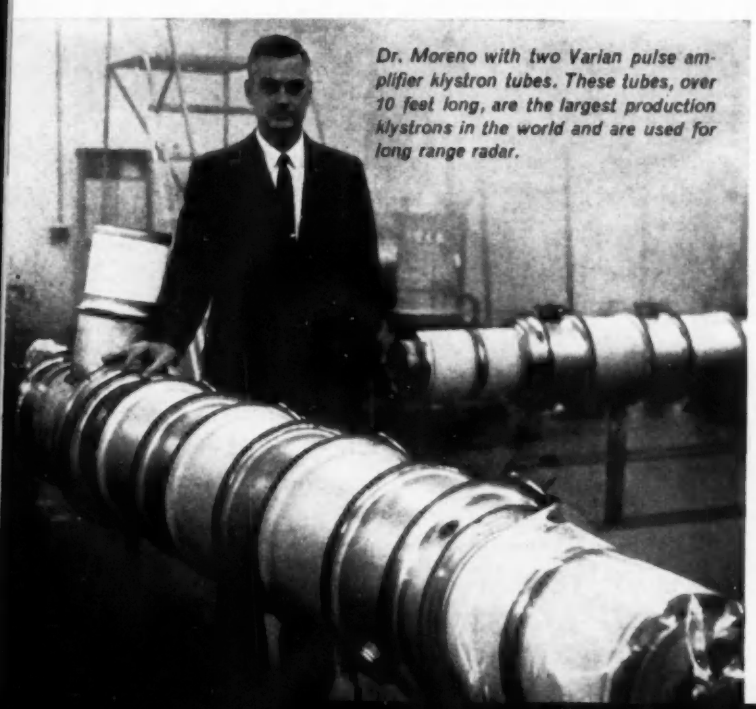
Lindberg atmosphere generators help VARIAN maintain rigid standards in volume production



Dr. Theodore Moreno, Vice President, Tube Division, Varian Associates, Palo Alto, California. Varian Associates is one of the country's foremost producers of equipment for a wide number of fields such as communications, navigation and aircraft control, advanced defense systems including early warning radars, and missile guidance, detection and ranging. Many Varian developments represent important advances in electronic technology.

QUOTE from Dr. Moreno

"Varian's success in the wide variety of electronic fields it serves depends not only on its ability to develop a technologically superior product but also on the development and maintenance of the production standards and capabilities required to retain this superiority in volume production. Our Lindberg Atmosphere Generators are making an efficient and dependable contribution to the consistent maintenance of these highly precise production standards."



Dr. Moreno with two Varian pulse amplifier klystron tubes. These tubes, over 10 feet long, are the largest production klystrons in the world and are used for long range radar.

Four Lindberg Atmosphere Generators are used at Varian Associates to provide dissociated ammonia atmospheres used in the production of microwave tubes. These include units with 1000 cfh, 2000 cfh, and 4000 cfh capacities. Varian also uses five Lindberg Furnaces for various research and production requirements. Lindberg has pioneered in practical equipment for producing all types of atmospheres for the treatment of metals and ceramics. If your product or processes need the application of atmospheres talk it over with Lindberg. Call your Lindberg Field Engineer (see your classified phone book) or write us direct. Gas Process Division, Lindberg Engineering Company, 2491 W. Hubbard St., Chicago 12, Ill.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, South Africa, Spain, Switzerland and West Germany.

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heat for industry

ONE STANDARD SCREW REPLACES MOST THREAD-CUTTING AND THREAD-FORMING SCREWS

NEW

TYPE S

TAPPING SCREW

with **LOW** drive torque...

HIGH strip torque

Square point provides 4 points of contact • Starts straighter • Offers chip-free driving • Low drive torque with high strip torque • Resists vibration . . . won't loosen • Uses same lead hole • Replaces most types of thread-cutting and thread-forming screws . . . simplifies inventory . . . assures better price break. Available in standard head styles, finishes and sizes . . . for unlimited applications • Compare features, tests, advantages and prices . . .

You'll buy TYPE "S" tapping screws!

Write for complete information.

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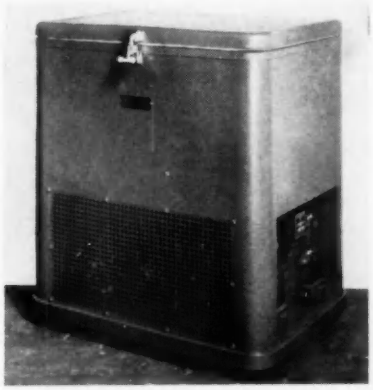
CABINET HARDWARE • LOCKS • PLASTICS • FASTENERS • APPLIANCE HARDWARE...ALL FROM ONE SOURCE

Circle 136 on Inquiry Card for more data

Preview of the 1961 DETROIT METAL SHOW

Metallurgical Chilling

HEAVY-DUTY chilling units have been designed to chill quantities of stainless steel to −120 deg F. This unit, model ST-120-15, has a chamber measuring 36 by 24 by 30 in., and has a capacity of 4000 Btu/hr at −120 deg F. It will chill 200 lb of



steel per hr from ambient temperatures to as low as −150 deg F.

Ruggedly constructed of 14 gauge steel, the cabinet is 48 in. high, 84 in. wide and 40 in. deep. The chamber is heavily insulated, and the electric requirements are 440-60-3, with a 115 V control circuit. *Cincinnati Sub Zero Products.*
Booth 1033

Circle 50 on Inquiry Card for more data

Lapping Compound Additive

THE manufacturers of Trulap lapping compound have developed an additive for extending the life of their compound. Granulaide, the new surfactant, evenly disperses small particles of diamond dust throughout the compound and maintains a high degree of activity among the surface particles. This keeps the compound from drying or draining away, yet eases the cleaning phases of the lapping operation.

Lubex, a second new product likewise extends the reformulated Trulap, claimed to be fast working, economical in application, easy to store and to remove from finished surfaces. The compound is laboratory produced from diamond powder graded to U. S. Bureau of Standards specifications.

Available in a micron range of 0-½ to 200 and mesh equivalent of 60,000 to 100, the improved Trulap is color coded to prevent misapplication of any of the wide range of diamond abrasive sizes and concentrations. *Wheel Trueing Tool Co.*
Booth 350

Circle 51 on Inquiry Card for more data

Vacuum Metallurgy

TWO new vacuum furnaces have been announced. One, an induction-heated melting furnace with a capacity of 50 lbs, has been designed for research and development work or small quantity production. The second is a cold-wall resistance-heated heat treating furnace of medium size, capable of operating at temperatures up to 1650 deg C (3000 deg F).

Among the features that particularly suit this furnace for research and development work is a new large-capacity alloy-additions system, which contains four 36-cu in. buckets and one 200-cu in. bucket enclosed in a single compact chamber together with a vibrated trough and chute. The full-opening lid of this chamber is transparent to permit continuous observation of the additions-procedure.

The buckets can be emptied onto the chute in any sequence desired, rather than in a pre-determined sequence (as in former systems), by means of external handles which are conveniently located at the operator's position on the upper level of the control platform.

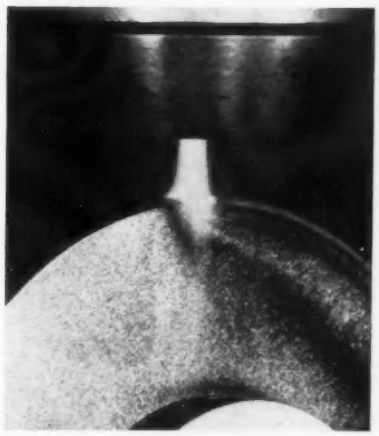
Semi-continuous operation of the furnace is facilitated by the incorporation of a 4-in. ball valve in the line connecting the additions system to the melting chamber, in place of the normal gate valve. This eliminates the possibility of the valve becoming clogged by small chunks of alloying material or by dirt. *F. J. Stokes Corp.*
Booth 268

Circle 52 on Inquiry Card for more data

Surface Coating

PLASMARC weld surfacing is a new precision method for depositing fully-fused overlays of wear- and corrosion-resistant alloys.

According to the manufacturer this process is the first developed that can deposit a very-thin fused coating with controlled dilution at high speeds. The overlay metal or allow is fed as powder in to the Plasmarc torch. Intense heat is created by the constricted plasma arc, produced within the torch and transferred from the torch to the work. Argon gas, used to form the plasma, also shields the



surfaced area from atmospheric contamination.

Plasmarc weld surfacing is a sister process to Plasmarc cutting, which was introduced in 1955 for smooth-finish cutting of metals up to 300 ipm.

Plasmarc weld surfacing equipment can precisely hold penetration of the overlay into the base metal to a minimum of 0.005 in.—or much higher if desired. Dilution of the overlay with the base can be precisely controlled from 5 pct or up to 50 pct depending on requirements. *Linde Co., Div. of Union Carbide Corp.*
Booth 127

Circle 53 on Inquiry Card for more data

RECOMMENDED
FOR O.E.M. USE...

when bearing requirements call for

SOMETHING EXTRA

call on

McQUAY-NORRIS

No matter what type of bearing — babbitt, sintered copper-lead, aluminum — McQuay-Norris makes 'em! And from our years of experience, you can be sure of that *something extra* in quality and performance.

McQuay-Norris bearings are made to S.A.E. specifications. They are precision designed to give superior service... cooler running... better heat transfer.

For stronger and longer bearing life, you can depend on McQuay-Norris bearings.

McQUAY-NORRIS MANUFACTURING CO., ST. LOUIS • TORONTO

News of the MACHINERY INDUSTRIES

Machine Tool Orders in August Display Practically No Change from Recent Buying Volume. For First Eight Months, Orders Are Running Slightly Ahead of Last Year's

By Charles A. Weinert

M-T Sales in August Just About the Same

Neither an upward nor a downward trend in new business is evident from the "status quo" results on machine-tool net new order bookings for the month of August.

August's orders were essentially of the same volume as July's—as well as of those booked in August of 1960.

For the first eight months, net new orders this year tally just a little higher than the bookings for the same period of last year.

With respect to both new orders and shipments, it should still be recalled that August was another vacation month — when activities usually slacken off a bit.

Net new orders in August amounted to a preliminary $56 million—compared to July's $55.65 million and August 1960's $56.85 million. These figures are for both metal-cutting and metal-forming machine tools combined.

Cutting-machine net new orders in August '61 are valued at $45.95 million—versus $46.7 million in July of this year and $47.8 million in August '60.

Forming-machine net new orders in August are given at $10.05 million—compared to $8.95 million in July, and $9.05 million in August '60.

For the first eight months of 1961, net new orders for both types of machines now total $442.95 million. The figure for the same period of last year is $435.7 million.

Cutting-machine orders so far this year are up almost 6 per cent over last year's equivalent record, amounting to $357.85 million versus $338.15 million.

In this year's cutting-machine bookings, foreign net new orders amount to $116.3 million—an increase of 25 per cent above the 1960 comparable figure of $92.8 million.

Forming-machine net new orders, in contrast with the situation on cutting machines, are down 13 per cent from the volume during the eight months' period of last year. The relative figures are $85.1 million this year, versus $97.55 million last year.

On shipments, the August value for both types of machines is $47.95 million. In July it was $49.75 million; while in August of 1960 it was almost identical at $47.9 million.

Although shipments of cutting machines amounted to $34.555 million in August '61 versus $36.5 million in August '60, if compared with the 1960 monthly average of $42.3 million the decrease is 18 per cent.

Conversely, while shipments of forming machines in August '61 amounted to $13.4 million compared to $11.4 million in August '60, the August '61 figure still represents an increase of 12 per cent above the 1960 monthly average of $12 million.

Further details and comparisons are given in the accompanying table.

Standards on G-P Tools Show Some Progress

The development of standards for general-purpose machine tools is evidently making progress, according to information just released by the industry committee known as the Cooperative Machine Tool Standards Group.

To date, representatives of this group of machine tool builders and users, including the Department of Defense, have agreed on proposals for grinding and milling machines.

These proposals are being submitted to the Office of Technical Services, U. S. Dept. of Commerce, for consideration as commercial standards. In line with the department's usual procedure, the proposals will be circulated to industry and Government for acceptance prior to printing as commercial standards.

Proposals on recommended stand-

(*Turn to page* 148, *please*)

METAL CUTTING AND FORMING MACHINE TOOLS

Net New Order Receipts, and Shipments

(Millions of Dollars)

	Net New Orders			Shipments		
1961	Cutting	Forming	Totals	Cutting	Forming	Totals
January	$35.75	$20.35	$56.10	$36.95	$ 8.55	$45.50
February	39.45	6.95	46.40	35.60	10.05	45.65
March	54.90	15.15	70.05	42.05	12.80	54.85
April	41.30	6.35	47.65	40.15	13.55	53.70
May	41.70	7.90	49.60	42.85	15.05	57.90
June	52.10	9.40	61.50	46.75	17.45	64.20
July	46.70	8.95	55.65	37.20	12.55	49.75
August	49.95*	10.05*	56.00*	34.55*	13.40*	47.95*
8 Months	357.85*	85.10*	442.95*	316.10*	103.40*	419.50*
1961 Avg.	44.73	10.64	55.37	39.51	12.93	52.44
1960 Avg.	41.93	12.50	54.43	42.30	12.00	54.30

* Preliminary.

Source of Statistics: National Machine Tool Builders' Assn.

Circle 137 on Inquiry Card for more data

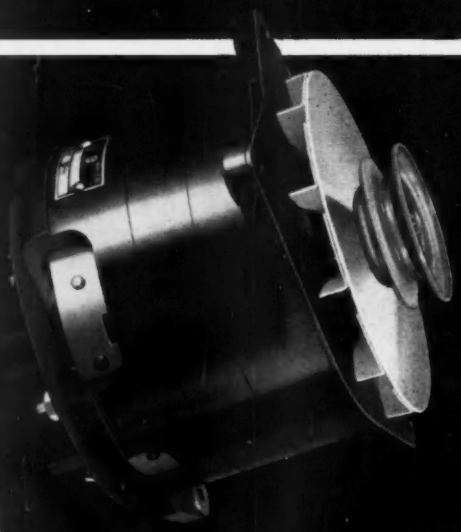
Leece-Neville

QUALITY ELECTRICAL EQUIPMENT SINCE 1909

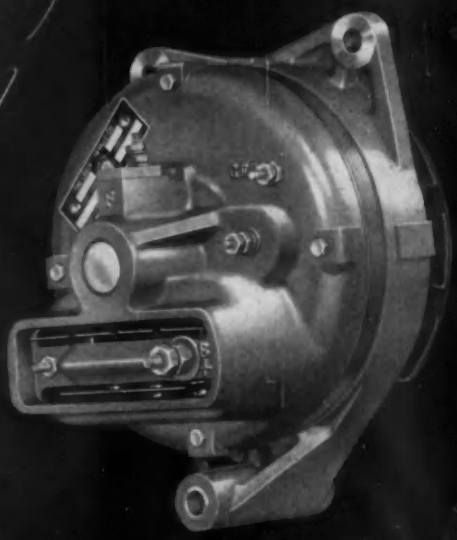
ALTERNATORS

TO MATCH ANY JOB REQUIREMENT

2074 SERIES
6, 12, 24, 32 Volt—60 Amp.
Medium-Heavy Duty for
cars, trucks, marine, industrial

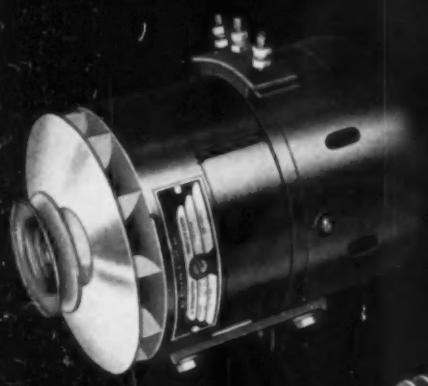


2038 SERIES
6, 12, 24, 32 Volt—60 Amp.
for marine, other corrosion
factor applications



6000 SERIES
6 and 12 Volt—40 Amp.
Light-Medium Duty for
cars, trucks, marine

2064 SERIES
12 Volt—150 Amp.
Extra Heavy Duty for
buses, earthmovers, etc.



2000 SERIES
6, 12, 24, 32 Volt—100-125 Amp.
Heavy Duty—Extra H.D. for
cars, trucks, marine, railroads, industrial

5300 SERIES
24 Volt—100 Amp.
. . . military applications

OTHER LEECE-NEVILLE HEAVY DUTY ELECTRICAL PARTS

More than 300 different alternators—each designed to provide adequate electrical power, save batteries, eliminate downtime and cut maintenance expense—are manufactured by Leece-Neville. The first alternators for automotive use were placed in service by Leece-Neville in 1945. Today, after 16 years of extensive and varied field service, the Leece-Neville line includes 6, 12, 24 and 32 Volt positive or negative ground types (all reversible) to fit almost any type of vehicle or match any electrical power requirement.

Leece-Neville also is a leading original equipment and replacement supplier of other quality electrical equipment such as illustrated at the right. All are designed for peak performance and long life.

Nationwide sales and service—for replacement alternators or other L-N parts, or for qualified service, contact any of the more than 1200 strategically located Leece-Neville Service Distributors.

New vehicle specifications—Leece-Neville alternators and other electrical parts are available as factory-installed equipment on most new vehicles. For more information, or for assistance in specifying the correct Leece-Neville alternator on your vehicles, just mail the coupon below.

D.C. GENERATORS
6, 12, 24, 32 Volt—to 55 Amp.

REGULATORS
for alternators, generators

CRANKING MOTORS
for diesel applications

SERIES PARALLEL SWITCHES
12, 24 Volt cranking systems

MAGNETIC SWITCHES
for 6, 12, 24, 32 Volt systems

FRACTIONAL H. P. MOTORS
6, 12, 24, 32 Volt—D.C. continuous and intermittent

110 VOLT POWER PACK
use with alternator to supply 110V power for lights, power tools, etc.—250 to 1800 Watt.

QUALITY ELECTRICAL EQUIPMENT
Leece-Neville
SINCE 1909

The Leece-Neville Company, Dept. AI-10
1374 East 51st Street, Cleveland 3, Ohio

Please send me:

☐ Name of nearest L-N distributor

☐ Literature (specify product)_____

☐ Help in specifying correct factory-installed alternators.

*Name*_____ *Title*_____

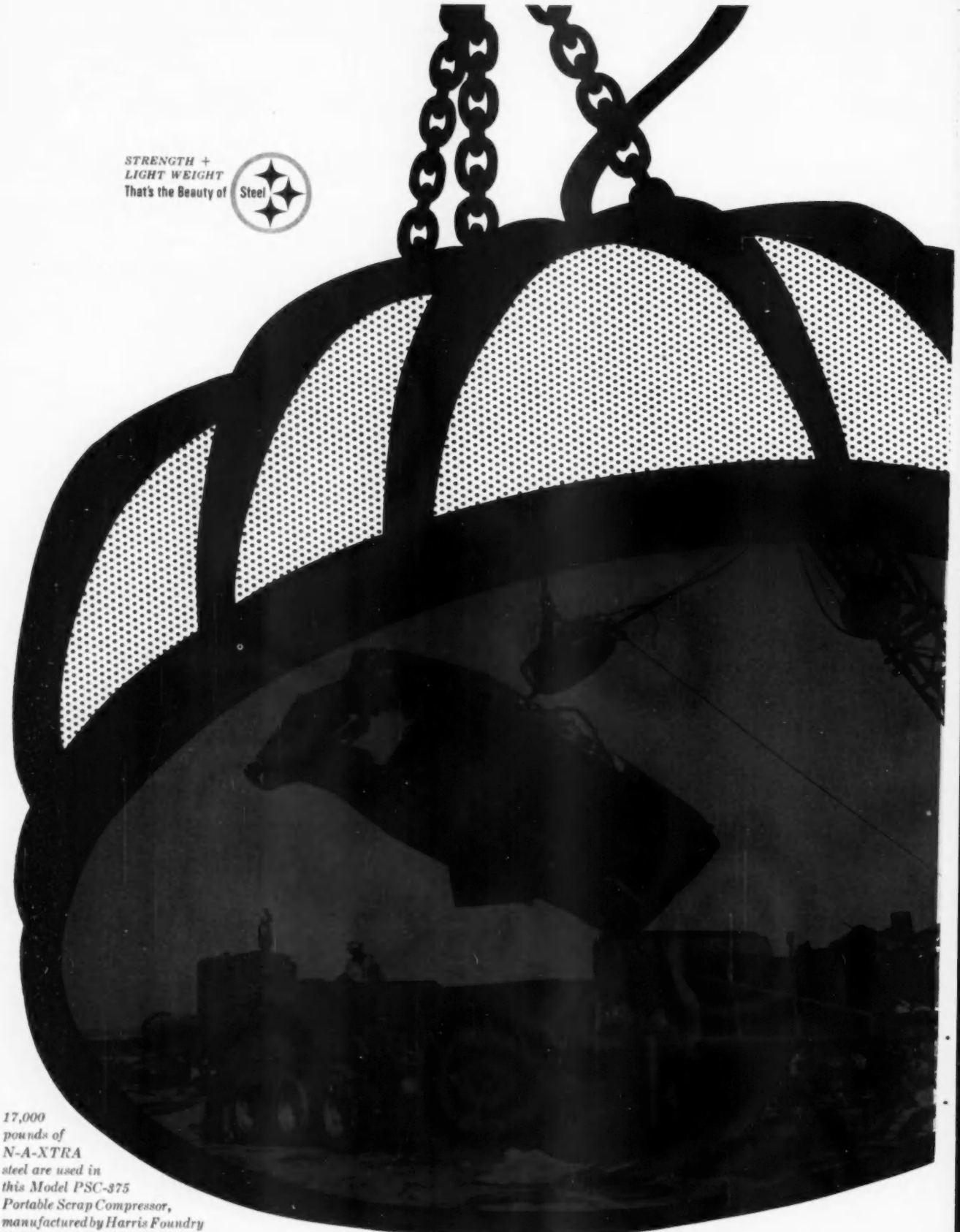
*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Circle 138 on Inquiry Card for more data

STRENGTH +
LIGHT WEIGHT
That's the Beauty of Steel

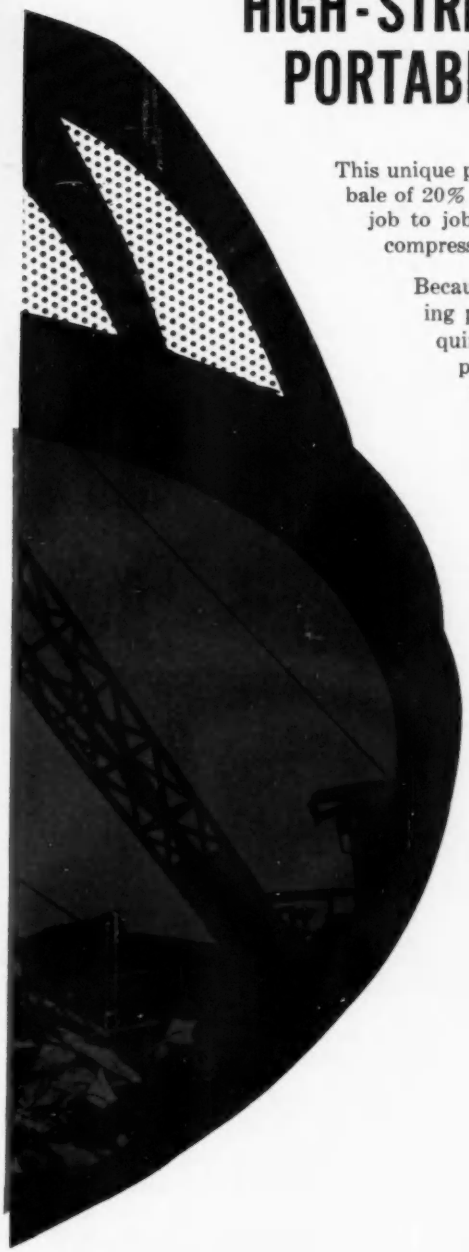


17,000 pounds of N-A-XTRA steel are used in this Model PSC-375 Portable Scrap Compressor, manufactured by Harris Foundry & Machine Co., Cordele, Georgia

STRENGTH + LIGHT WEIGHT OF

N-A-XTRA

HIGH-STRENGTH STEEL SOLVES PORTABLE SCRAP COMPRESSOR PROBLEM



This unique portable scrap compressor can squeeze an entire auto body into a 21" x 36" x 24" bale of 20% dense steel scrap, using a ram pressure of 375 tons. Designed to be hauled from job to job by a conventional truck-tractor, it goes to work in outlying wrecking yards, compressing bulky scrap into marketable bales that can be shipped economically.

Because it must be moved over the highway and meet established load limits, a pressing problem in designing the PSC-375 was weight. Mild carbon steel with the required strength would weigh too much. N-A-XTRA high-strength steel solved the problem. It fully met all strength and fabrication requirements, yet kept total unit weight within acceptable limits for portability.

Portability may not be the controlling factor in your product—but the same steel that solved this problem is the one to remember when only the strongest steel will do. Pound for pound, N-A-XTRA steels are nearly three times stronger than mild carbon steel. Rugged conditions, heavy loads and weight-saving construction—in such applications, for example, as heavy machinery and pressure vessels—are challenges that N-A-XTRA is designed to meet.

With excellent weldability, formability, and toughness even at subnormal temperatures, N-A-XTRA low carbon, extra strength alloy steels give superior results with conventional fabricating methods, including cold forming, gas cutting, shearing and machining. N-A-XTRA high-strength steels are available in four levels of minimum yield strength, from 80,000 to 110,000 psi, and in sizes ranging from ⅛" to 1" thick, up to 72" wide and up to 35' long. For further information, write Product Development, Dept. AI-12, Great Lakes Steel Corp., Detroit 29, Michigan.

DESIGN NOTE: Model PSC-375, Portable Scrap Compressor, uses N-A-XTRA 100 (minimum yield strength, 100,000 psi) in engine and tank mounts, bed and side ribbing, arm housings and end housing. Sizes—¼", ⅜", ½", ¾" and 1" thick. Fabrication followed standard gas cutting and welding procedures.

N-A-XTRA
HIGH-STRENGTH STEELS

a product of
GREAT LAKES STEEL
Detroit 29, Michigan

N-A-XTRA STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

Benedict-Miller, Inc. Lyndhurst, New Jersey	Joseph Demsey Co. Cleveland, Ohio	Ducommun Metals & Supply Co. Los Angeles, California
Interstate Steel Co. Des Plaines, Illinois	Lockhart Iron & Steel Co. Pittsburgh, Pennsylvania	Marsh Steel & Aluminum Co. Kansas City, Missouri
O'Neal Steel, Inc. Birmingham, Alabama	Salt Lake Hardware Co. Salt Lake City, Utah	A. C. Leslie & Company, Ltd. Montreal, Canada

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

Circle 139 on Inquiry Card for more data

Multiple Lip Rod Seal with Wear Compensating Spring
Large Area Heat Treated Sintered Metal Rod Bearing
Patented Restricted Orifice With Intermediate Valving Gives 3-Stage Control On Rebound Valve
New, Improved Design Coil Spring Base Valve with Larger Intake Capacity

You bet your life on your shock absorbers

And so do drivers of cars you manufacture. As you know, shock absorbers do far more than cushion the ride. They hold wheels solidly on the road, control spring action, provide car stability. That's why it's important for you to specify shocks which give the greatest control for the longest time.

Monroe shock absorbers are engineered to extremely close tolerances, and an advanced coil spring design provides longest valve life of all shocks. Superior design makes Monroe shocks respond swiftly and sensitively to all road conditions and prevents premature wear.

Monroe shocks are the miles-ahead, year-after-year leader in replacement sales. So why not give new car buyers their preference as original equipment? Our engineers will be glad to give you the facts and figures on Monroe superiority.

MONROE
SHOCK ABSORBERS

MONROE AUTO EQUIPMENT COMPANY • Monroe, Michigan • *World's Largest Maker of Ride Control Products*

POWER STEERING • SWAY BARS • TRACTOR SEATS • SUPER LOAD-LEVELER® (stabilizing units)

ALLIED RESEARCH
COMPACT RECTIFIERS
3000 amperes—12 volts each
Size: 34" x 34" x 46"
Total height: 114"
Available with conventional or automatic controls

FOR SALE:

Full performance in a compact size rectifier

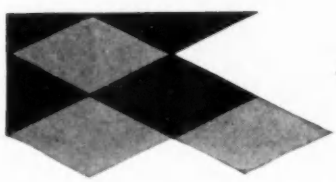
1000, 3000, 12,000, 20,000—whatever the amperage you need, you save valuable floor space and money by using Allied's Compact Silicon Rectifiers.

What's missing from Allied's Compacts? Nothing but expensive hot air. What's in it for you? Extra diodes, plenty of copper and big, rugged transformers to give full-size performance . . . all in a smaller cabinet to save you money.

But, this isn't the full value story. We know that when a rectifier stops, so do your profits. So, we've also included a new, efficient cooling system and exclusive protective devices to cut downtime and increase rectifier life.

You can build your own capacity with Allied Compacts. Use any combination of 1000 to 3000 ampere building block units side by side or stacked up to meet present or future needs.

Get full details on Allied Compact Rectifiers from your Allied representative today. He's listed in the Yellow Pages under "Plating Supplies". Or, write direct.



Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET • BALTIMORE 5, MARYLAND

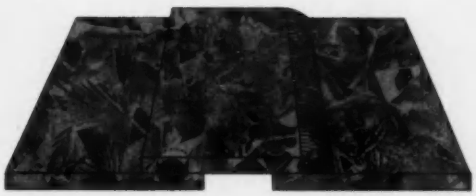
Affiliated operations in principal countries

Circle 140 on Inquiry Card for more data

Circle 141 on Inquiry Card for more data

Circle 142 on Inquiry Card for more data

OUR CHALLENGE STANDS! "Anything that can be made of steel sheets can be made of Wheeling SOFTITE Sheets!" This tough, dependable galvanized coating performs perfectly . . . *can't* flake or peel even during the difficult fabricating operations shown on the right. See your Wheeling man . . . or write for full details to Wheeling Steel Corporation, Wheeling, West Virginia.



Spot-weld it!

Paint it!

Solder it!

Fold it!

Lock it!

Deep-draw it!

Spin it!

It's Wheeling Steel!

WHEELING STEEL CORPORATION

DISTRICT OFFICES:

Atlanta
Boston
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Philadelphia
St. Louis
San Francisco
Wheeling

WHEELING CORRUGATING COMPANY *Subsidiary*

Atlanta
Boston
Buffalo
Chicago
Columbus
Detroit
Houston
Kansas City
Louisville
Martins Ferry
Minneapolis
New Orleans
New York
Philadelphia
Richmond
St. Louis

Cars run "cotton quiet" with timing gears molded from Celoron® by C. D. F. Celoron's macerated cotton fabric base provides the low natural tone frequency needed to minimize the sounds of the timing drive. Along with its advantages in sound harmonics, Celoron—a molded phenolic—endows gears with vital qualities of high tooth strength and great resistance to impact and high temperatures.

Another example of how C. D. F., with its broad range of materials and production facilities, serves the automotive industry!

CDF® CONTINENTAL-DIAMOND FIBRE

CONTINENTAL-DIAMOND FIBRE CORPORATION, NEWARK, DELAWARE • A SUBSIDIARY OF THE Budd COMPANY

Cooling off hot problems—

24 successes in 24 attempts...and ready for the 25th

Automotive air conditioning manufacturers have come to think of us as helpful *control* specialists in their highly specialized field.

Since 1953 that's been the case. Our engineers have been on the "hot spot," ironing out car air conditioning control and systems bugs in a hurry.

This same veteran technical task force has come up with 24 new cool-working solutions . . . designing and building thermostatic expansion valves, pressure regulators, drier-receivers and distributors shown above.

Whether a single component or the complete control package is the hot problem in your auto air conditioning, we'd like to make it our 25th challenge. And you get the follow-up economy of high-volume production plus the convenience of coast-to-coast jobber coverage for future replacements.

A note on your letterhead will bring fast action from Controls Company of America, Milwaukee 10, Wisconsin.

These independent automotive air conditioner and automobile manufacturers rely on Controls Company of America:

CHRYSLER
FORD
AMERICAN MOTORS
FORD, MERCURY DIV.
ARA
CAPITOL
CLARDY
CLIMATIC AIR
FRIGIKAR
FRIGQUIP
J. E. MITCHELL
PARKOMAT
NOVI

Creative controls for industry

CONTROLS COMPANY OF AMERICA

HEATING AND AIR CONDITIONING DIVISION

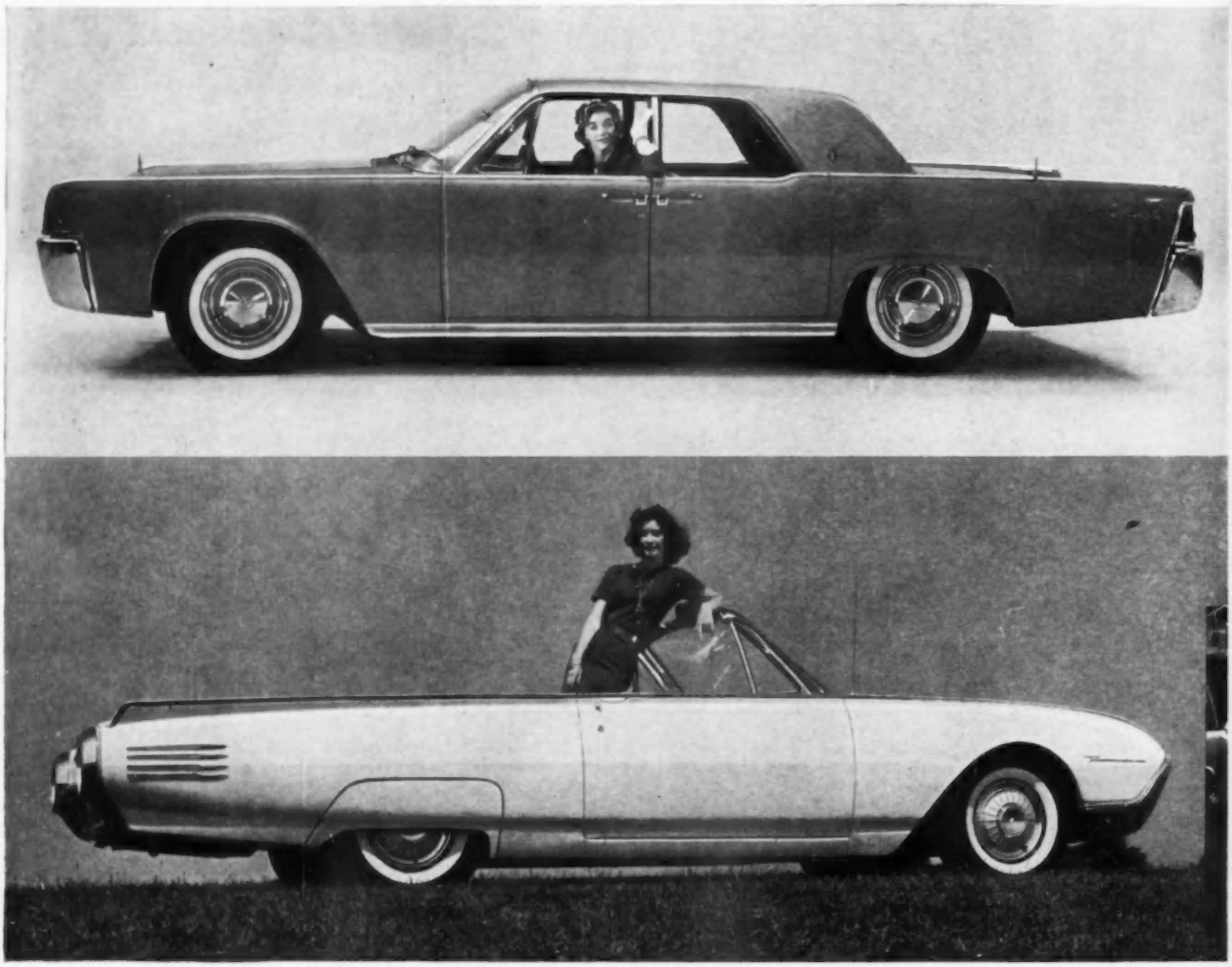
HAC-34-60

2415 N. 32nd Street, Milwaukee 10, Wisconsin • Cooksville, Ontario • Zug, Switzerland

Circle 145 on Inquiry Card for more data

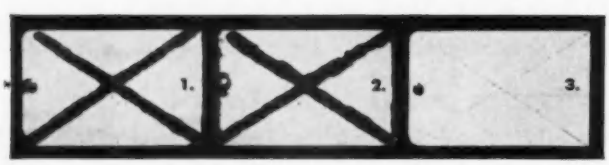
Take a lead from the leaders . . .

Amchem GRANODINE* Phosphate Protection in Depth for Lincoln



Ford Motor Company's luxurious Lincoln Continental and fabulous Thunderbird have established new heights of fine car performance while creating "classic" standards in motor car design.

GRANODINE—The obvious difference in pre-paint treatments



1. Solvent-cleaned—panels failed after 100 hours of accelerated testing.
2. Alkali-cleaned—panels failed after 100 hours of accelerated testing.
3. Granodine-treated—panels excellent after 336 hours of accelerated testing.

Coatings Provide Pre-Paint Continentals and "T-Birds"

Phosphatizing process key to producing rust-proof bodies, long lasting, quality paint finishes

At Ford Motor Company's Lincoln Continental and Thunderbird production plant quality manufacture is the by-word as experienced craftsmen turn out the last word in automotive style and performance.

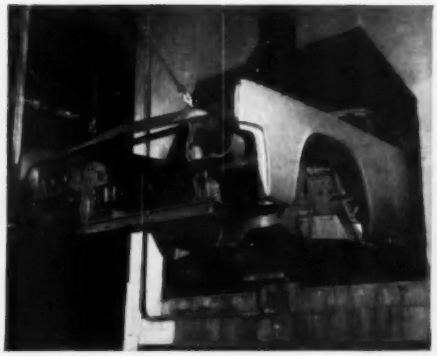
High among the many quality operations incorporated into these fine cars is the special attention lavished on the pre-paint chemical treatment of bodies and other steel and galvanized automotive parts.

Utilizing the production-proven advantages of Granodine zinc phosphate coatings, this world-renowned automobile producer is providing potential buyers with the ultimate in quality body work, the result of Granodine's greatly improved corrosion resistance and bonding qualities combined with an already highly efficient baked enamel paint system.

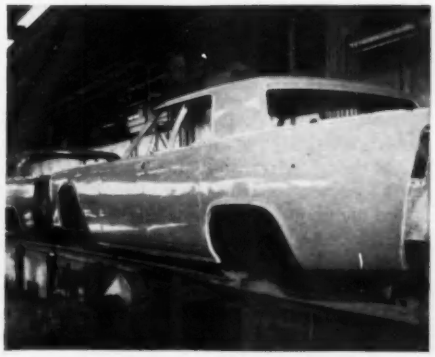
Since 1933 Granodine has been demonstrating its dependability in industrial pre-paint operations. Amchem's experience and technical know-how in metal protection techniques assure you that Granodine will meet present day high volume production schedules with minimum maintenance and operator attention. Call your local Amchem Representative for complete details.

*Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.

Body in white in metal finishing area prior to phosphating.



Granodine-treated body at exit end of phosphate washer.



Phosphatized body is seen in final paint line.

AMCHEM **GRANODINE**

Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

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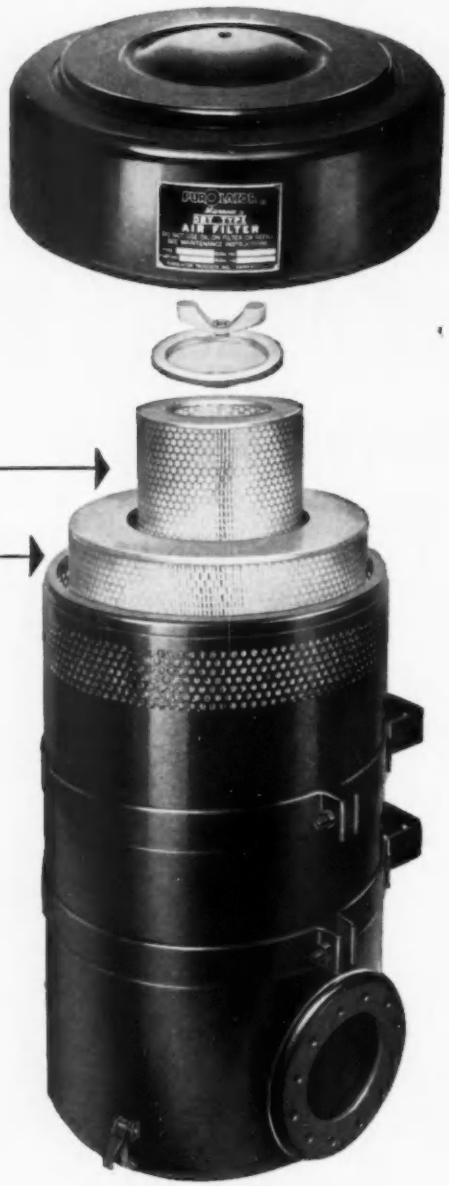


an element here

and an element here

assures 99.98% filtration efficiency even when 1 element is out of operation

IT'S THE NEW PUROLATOR TWO-STAGE FILTER

Simplicity of design makes the first cost of Purolator's new dry-type two-stage filter as low as any two-stage filter on the market. Each element filters independently, and together they dustproof your engine as no other filter can . . . 99.98% efficient.

Users save money and get better engine protection from this new Purolator filter, too. The first stage element will last up to 2000 hours, depending on operating conditions. The second stage will usually last almost indefinitely if the first element and sealing gaskets are maintained properly.

Another big user-advantage is the way the two-stage design protects the engine despite accidental mishandling of the element. Even if the first stage element is damaged, the chance of harming the engine can be discounted when it is protected with the second stage back stop element. In addition, the second stage element lets the operator service the unit in the field, regardless of how dusty the conditions are.

Both elements filter uniformly, in depth, over their whole surface, because they're both precision made of plastic impregnated cellulose. This series of two-stage filters is rated from 450 to 1150 cfm, with exceptionally low initial restriction. Mounting straps, rainhoods and outlet adapters are available.

For more information write to Purolator Products, Inc., Department 3896, Rahway, New Jersey.

Purolator Products, Inc.
Dept. 3896, Rahway, New Jersey

Please send me complete data on the new Purolator two-stage filter series.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, CANADA

Circle 147 on Inquiry Card for more data

1. DENSITY • Feel the difference in Schlegel woven pile. It's uniformly dense for performance and long life, with density controlled to give proper operation of movable parts and insure a positive seal.

2. RESILIENCE • Schlegel pile withstands the severest shock tests and will not break down or lose its shape. It adjusts quickly to uneven surfaces, keeping an airtight seal under all weather conditions.

3. SILICONE-TREATED • See how Schlegel pile resists moisture? Dow-Corning silicone treatment increases both the moisture resistance and the resilience of the pile.

4. PILE HEIGHT CHOICE • Choose any pile height from .080 to .500. Schlegel holds close tolerances within this range, and offers an assortment of more than 1,000 parts and shapes.

5. INTERWOVEN PILE • Each strand of yarn is wound through and around a strong resin-impregnated backing.

ALL GLASS CHANNEL LINER IS NOT ALIKE!

Five good reasons why **leading engineers specify Schlegel glass run channel liner**

The five product features shown above add up to a glass run channel liner that will last, trouble-free, for as long as the automobile windows you install it in.

Schlegel pile liner in your window channel ensures weather-tight, rattleproof, smooth-operating automobile windows. Schlegel pile won't swell or stick, either—your window will roll up and down effortlessly for years to come.

Test Schlegel pile yourself, in your own wear-testing lab. Then *specify* Schlegel pile liner in your glass run window channels and in other sealing applications. You'll be in good company. Automotive engineers have been specifying Schlegel pile since glass windows were first used in cars.

Schlegel

SERVING THE AUTOMOTIVE INDUSTRY

SCHLEGEL MANUFACTURING COMPANY

1555 Jefferson Rd., Rochester 23, N.Y. In Canada, Oakville, Ont.

Circle 159 on Inquiry Card for more data

Beauty that can take hard knocks... Nickel-Chrome Plating Over Steel

Strength and beauty are combined in bumpers of *Nickel-Chrome Plating over Steel*—steel for strength to withstand impact, and Nickel-Chrome Plating for brilliant beauty that highlights styling.

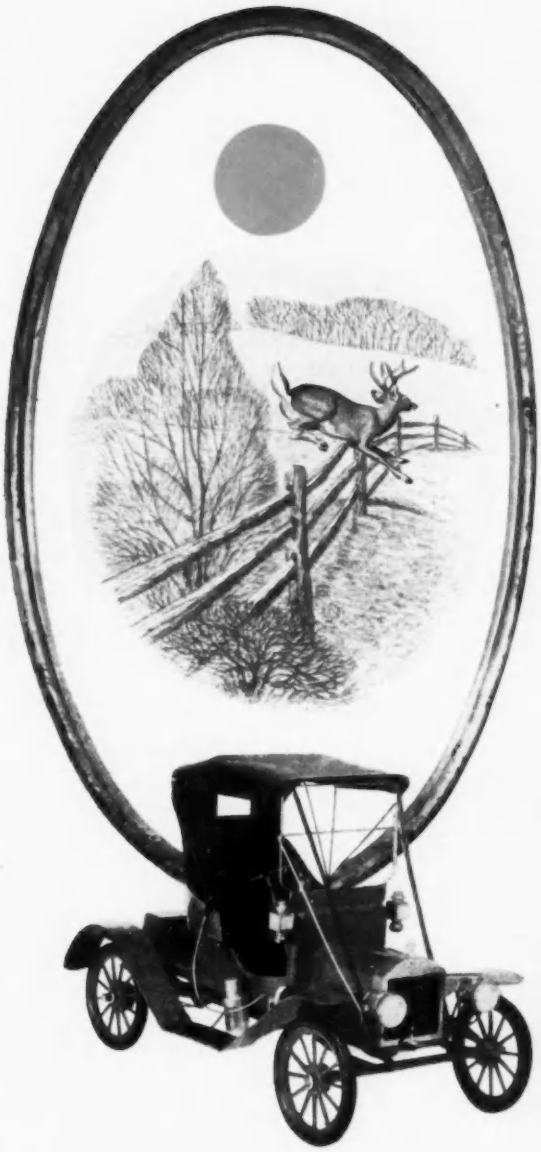
It's lasting beauty, too. A thick layer of semi-bright Nickel guards against corrosion. A layer of bright Nickel gives additional corrosion protection and forms a lustrous, durable base for the finish coat of chromium. The result is an unequaled combination of strength *and* beauty that resists impact, scratching and corrosion, and meets the high standards of today's quality-conscious customers.

For information about the performance of *Nickel-Chrome Plating over Steel,* write for the free booklet, "Decorative Plated Coatings of Improved Durability."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.

Inco Nickel *makes plating perform better longer*

Circle 149 on Inquiry Card for more data



Morse quality timing chains: best under the sun for more than fifty-six years

There are good reasons why Morse timing chains are original equipment in over 76% of all American cars. For more than 56 years they have provided perfect valve timing—like the timing of a fine watch, and every bit as quiet. Morse quality control is of the highest order, from steel purchased in special mill runs, to laboratory hardness tests, to demagnetization. As a finishing touch timing chains are even vacuum-cleaned to remove foreign particles which might affect long life. What better reasons could there be for anyone to specify Morse? For further information, write: Morse Chain Company, Dept. 36-101, Ithaca, New York. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

MORSE

A BORG-WARNER INDUSTRY

B-W

COLD FINISHED STEEL BARS ASSURE

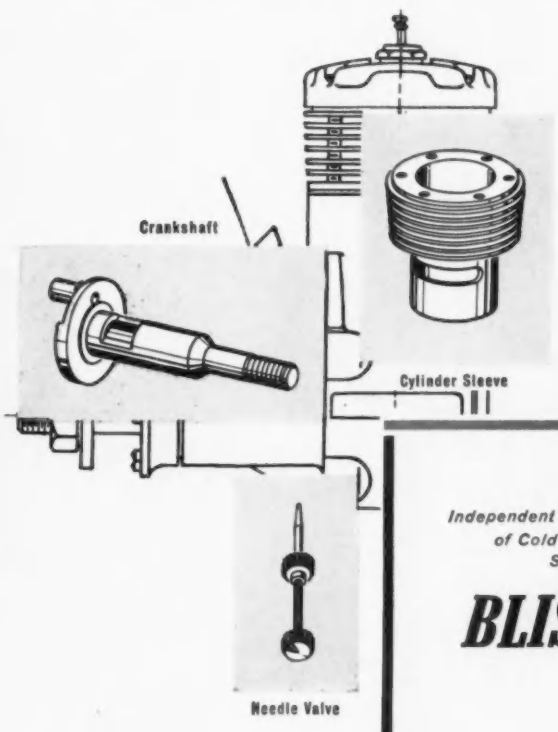
GRUELING MODEL FLYOFFS AT 125 mph

Only steel provides the stamina demanded for critical components of tiny model airplane engines. These midget powerhouses, weighing less than 8 ounces, are capable of speeds up to 125 mph during grueling flyoffs. Only cold finished steel bars can withstand that kind of field service.

For every 25,000 of these little engines, Bliss & Laughlin ships a carload of C-1213 and Ledloy A bars. Here is another example where Bliss & Laughlin furnishes precisely what is needed in strength and machinability. No more, no less. This means profitable production—whether for models or jets—because both the cost of materials *and* the cost of machining are considered.

Only cold finished steel bars are technically correct and economically sound for hundreds of thousands of applications. Check out your designs with Bliss & Laughlin. As the leading specialist in strength, finish, accuracy, straightness and machinability for 70 years, Bliss & Laughlin recommends the most suitable and economical bars from the industry's largest line of cold finished steels.

Seven mills across America, collaborating with Steel Service Centers everywhere, assure prompt, helpful, local service.



Bliss & Laughlin 1⅜" and 5/16" Ledloy A rounds are machined into complex cylinder sleeves and miniature needle valve bodies and knobs for the McCoy "35" Red Head Stunt Engine. Sleeves are black oxided for appearance and rust resistance. Tiny crankshafts are produced from 1⅛" C-1213 rounds, cyanide hardened for wear resistance and coated with molydisulphide for friction resistance.

BL-618

Leading Independent Producer of Cold Finished Steel Bars

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. MILLS: Harvey, Ill., Detroit, Cleveland, Buffalo, Mansfield, Mass., Los Angeles, Seattle

Circle 151 on Inquiry Card for more data

"COMPLETE CONTROL"

MIDLAND TREADLE VALVE

TOUGH-BUILT FOR TRUCK SERVICE

COMPLETE CONTROL OF DELIVERY. Provides brake feel.

UNRESTRICTED DELIVERY CAPACITY assures speedy application . . . maximum system time-pressure balance.

COMPACT for easy installation . . . versatile for line connection.

LIGHT WEIGHT.

NO ADJUSTMENT NECESSARY. Valves are preset at assembly and no operational adjustment is needed.

CORROSION-RESISTANT. All parts are chemically treated or plated to resist corrosion.

MIDLAND

MIDLAND-ROSS CORPORATION

Owosso, Michigan

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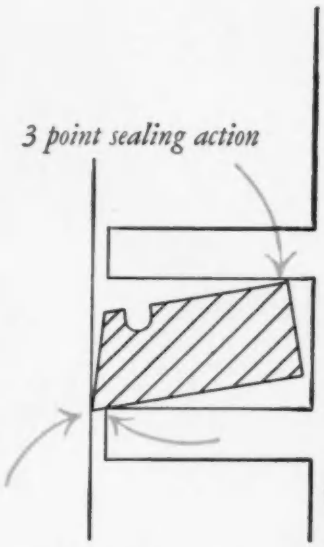
Circle 153 on Inquiry Card for more data →



new, for high vacuum engine compression and oil control—

UNISEAL COMPRESSION RING

REVERSE TORSION

A new concept in reverse torsion compression rings is now available in the form of a one-piece, cast iron ring with positive side sealing. This new reverse torsion ring is especially valuable in providing oil control in high vacuum engines. The ring is taper-faced with a front groove on top to achieve reverse torsion. Used in the second groove, it effectively seals oil from below, keeping it out of the groove.

The new Uniseal Compression Ring takes its place in the long line of Ramco Ring developments. You may find some of these particularly interesting to you. Your phone call or letter will bring you the full story.

Piston Rings by THOMPSON PRODUCTS RAMCO DIVISION

TRW

Thompson Ramo Wooldridge Inc. • Dept. H., P. O. Box 513 St. Louis 66, Mo.

AUTOMOTIVE GROUP

THOMPSON PRODUCTS LIGHT METALS DIVISION | THOMPSON PRODUCTS MICHIGAN DIVISION | THOMPSON PRODUCTS VALVE DIVISION | THOMPSON PRODUCTS RAMCO DIVISION | THOMPSON PRODUCTS MOTOR EQUIPMENT MANUFACTURING DIVISION

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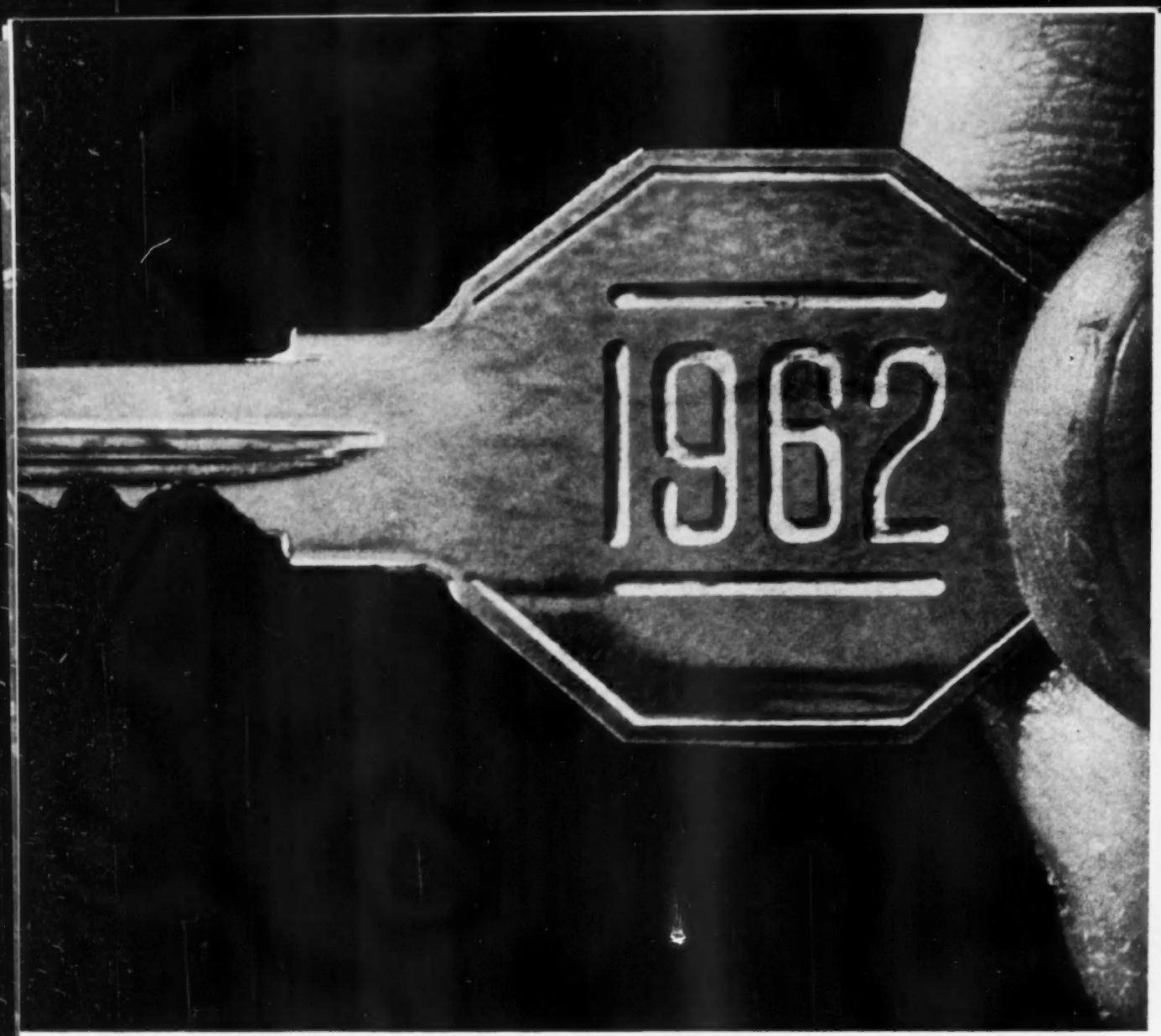


A new feel in driving

When the nation's motorists turn the key...

. . . they'll agree. The new '62's act better. Look better. *Feel* better to drive than cars of any other year. In fact they're stepping out with more power per pound than any in history!

If the new cars feel better, it's largely because firms who supply parts to Detroit—working with Kaiser Aluminum—helped make each car *lighter* with aluminum.

Aluminum engines dump the weight. Ten per cent of the 1961 cars have aluminum engines. You will see more of them in future cars. One reason: the first big die-cast aluminum engine blocks—result of a ten-year die-casting development program by a casting supplier, assisted by Kaiser Aluminum.

These aluminum engine blocks can dump out as much as 200 pounds overall weight and bring other advantages of durability, cool running, and high production rate. Adding to a growing list of other aluminum parts—from transmission housings and brakes to hundreds of small items—aluminum engines are creating lighthearted new cars.

Trim new metals. One of the major contributions for '62 is victory in the search for dent-resistant aluminum for trim. The suppliers of trim guided development and factory tests of a new alloy—Kaiser Aluminum Alloy 5252. In the new cars Alloy 5252 delivers impact resistance and appearance comparable to more costly metals. Uses the same fasteners. Eliminates rust along trim edges. And knocks off still more dead weight.

starts here!

In each part where aluminum makes a debut in '62, it brings lightness, economy, performance ... . helps create a new feel in driving.

Kaiser Aluminum is pleased to be at the heart of this trend. Our plant on the Ohio River, at Ravenswood, W. Va., serves Detroit as the nearest fully integrated aluminum development and production center.

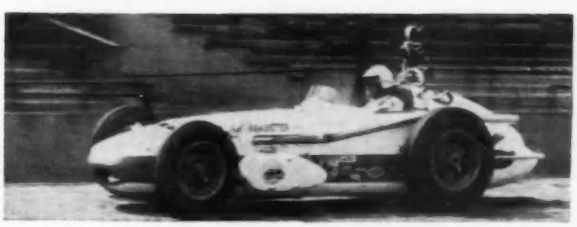
For experienced assistance in any automotive engineering or design problem that involves use of aluminum, contact Kaiser Aluminum Automotive Industry Division, IBM Bldg., Detroit 2, Michigan. Phone TRinity 3-8000. □

KAISER ALUMINUM

Watch Kaiser Aluminum's salute to lighthearted "Low Calorie Cars"

See Indianapolis winner Rodger Ward take the driver's seat for a thundering television message up to 170 mph. He'll be showing millions the advantages of lighter weight in beautiful "low calorie cars"—the slim, trim new 1962's!

On "Follow the Sun", Sundays, ABC-TV (Channel 7 in Detroit)



A new feel in driving starts here

These suppliers helped make the new '62 cars trim, light and powerful with Kaiser Aluminum:

Aluminum Specialty Company
Anderson Bolling Mfg. Co.
Bright-O, Inc.
Carter Carburetor Div. of Ace Industries, Inc.
Central Metal Products,
Division of Zenite Metal Products
C. Cowles & Company
C. M. Hall Lamp Company
Croname, Inc.
Detroit Engineering & Machine Co.
Detroit Gasket & Mfg. Co.
Doehler-Jarvis Division of National Lead Co.
Douglas & Lomason Co.
Eaton Manufacturing Company—
Stamping Division
The Electric Auto-Lite Company
Electro-Chemical Engraving Co., Inc.
Firestone Steel Products Co.
The Fox Company
General Motors Corporation Divisions:
A. C. Spark Plug; Brown-Lipe-Chapin; Central Foundry; Chevrolet Flint Mfg.; Delco Appliance; Delco Radio; Delco-Remy; Guide Lamp; Harrison Radiator; Rochester Products; Ternstedt
The Harrington & King Perforating Co., Inc.
Hayes Industries, Inc.
Hamill Mfg. Co., Inc.
Jervis Corporation
Kelsey-Hayes Co.
Keystone Metal Moulding Co.
Light Metals Corporation
Lescoa, Inc.
Lincoln Engineering Company
Div. of the McNeil Machine & Engineering Co.
Lobdell Emery Mfg. Co.
Metal Products Div. of Thompson Industries, Inc.
Mirro Aluminum Company
Namco Division of Hayes Industries, Inc.
National Decorated Metal Company, Inc.
Northern Engraving & Mfg. Co.
Peters Stamping Co.
Primeweld Corp.
Rogers Industries, Inc.
P. R. Mallory & Co., Inc.
Ryerson & Haynes, Inc.
Schlegel Mfg. Co., Inc.
Stamping Division—Chrysler Corporation
The Standard Products Co.
Tassell Hardware Co.
Wagner Electric Corporation

KAISER ALUMINUM

AUTOMOTIVE INDUSTRY DIV., IBM BLDG., DETROIT 2, MICH., TR. 3-8000

Circle 154 on Inquiry Card for more data

MANUFACTURERS' NEWS

Koppers Research Center Opens

Koppers Co., Inc., has opened its newest and largest research facility at Somervell Park, Monroeville, Pa. Dedicated a month ago, it cost $8.5 million. Koppers, identified with engineering and construction until 1946, moved into chemicals and plastics then. One-third of the buildings planned for the 176-acre site have been completed. Dr. Paul W. Bachman, vice president and director of research, said the

New Koppers Research Center

center eventually will house more than 1500 scientists. The center consists of a five-story administration building, three three-story interconnecting laboratory wings, and several outlying auxiliary buildings.

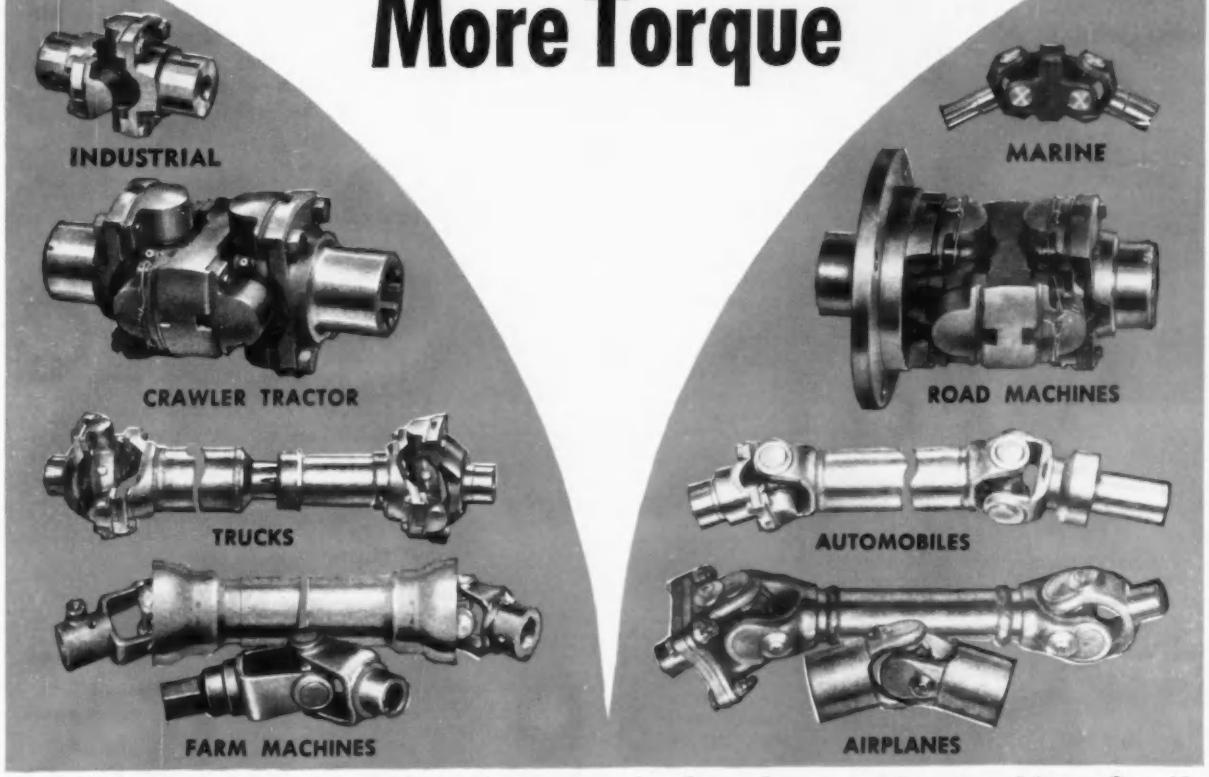
Clark's New Test Laboratory

Clark Equipment Co.'s Automotive Div. has opened a new engineering test laboratory for testing and evaluating Clark's line of mechanical and hydraulic transmissions and torque converters. The Jackson, Mich., facility enables Clark engineers to pre-test prototypes and eliminates as much as 75 per cent of time-consuming field-testing. The laboratory contains 9500 sq ft of floor space. A 4800 sq ft section is used to tear down and reassemble highway trucks, construction equipment, fork lift trucks, farm tractors and other vehicles.

Kaman Sales, Net Increase

Gains in sales, net earnings and the ratio of earnings to sales have been reported by the Kaman Aircraft Corp. Sales for the first six months of 1961 increased to $27.7 million from $23.4 million for the same 1960 period. Net earnings for the period were $387,316 as compared with the 1960 figure of $290,358. Earnings per share increased nearly 30 per cent despite an increase in the number of shares outstanding. Kaman reported earnings of 85 cents a share this year. The 1960 first half net was equal to 69 cents a share.

MECHANICS
Gives YOUR PRODUCTS More Torque



Conclusive tests have shown that using any of these rugged, powerful MECHANICS' Designed Roller Bearing UNIVERSAL JOINTS will give YOUR PRODUCTS more torque. More torque means more power. More power means more work capacity. More work capacity means more satisfied customers. More satisfied customers means more business for YOU.

Give your products top performance, top output, and a top production rating that is free from service troubles. Specify MECHANICS Roller Bearing UNIVERSAL JOINTS.

Combine MECHANICS' proven production flexibility, manufacturing efficiency and many, many years of experience with YOUR PRODUCT for a powerful increase of YOUR SALES. Write today for our NEW FREE CATALOG J-1960, which gives dimensions, capacity tables and complete specifications.

MECHANICS UNIVERSAL JOINT DIVISION
BORG-WARNER CORPORATION
2024 HARRISON AVENUE ROCKFORD, ILLINOIS
Export Sales: Borg-Warner International • 36 So. Wabash, Chicago 3, Illinois
Roller Bearing **Joints For Cars • Trucks • Tractors • Farm Implements •**
• Road Machinery • Aircraft • Marine • Busses and Industrial Equipment •

MECHANICS B-W UNIVERSAL JOINT BORG-WARNER

For safe stripping of aluminum

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

Strip anything from aluminum even epoxies . . . with complete safety

Salvage expensive aluminum parts *safely* in a tank of Oakite Stripper S-A. It strips the toughest finishes in minutes, with no danger of etching the aluminum beneath. Saves the part . . . saves *you* costs.

Stripper S-A works faster than almost anything else you can try on paints, lacquers, coatings and adhesives, including the new epoxy, acrylic, vinyl and polyester types . . . yet, it's completely safe for such metals as steel, stainless steel, copper and brass as well as aluminum. Has no flash point, works without heat.

And Stripper S-A is only one of a long line of Oakite stripping compounds for safe reclamation of rejects. There are strippers for maximum economy . . . for maximum speed . . . for *any* method of application. ASK THE OAKITE MAN. Or write for Bulletin F-7893, Oakite Products, Inc., 25A Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

over 50 Est. 1909 SCIENCE years' leadership in industrial cleaning

MORE GOVERNMENT CONTRACT AWARDS

LATEST contracts awarded by various Government agencies, and covering primarily automotive and aviation products, are listed in the following. Typical of the items contained in these monthly listings are: passenger cars, motor trucks, aircraft, military tanks, engines, transmissions, other components, spare parts, plant equipment, etc. This list is for the period Sept. 1 to Oct. 1 inclusive.

AUSTIN-HASTINGS CO., INC., Cambridge, Mass.
Machine, Grinder, 1 ea.—$32,222

BUFFALO-SPRINGFIELD CO., DIV. KOEHRING CO., Springfield, Ohio
Drilling Rigs, 1 lot,—$15,566

CHRYSLER MOTORS CORP., Washington, D. C.
Trucks, various, 1,753 ea.—$3,952,725

CLARK EQUIPMENT CO., INDUSTRIAL TRUCK DIV., Battle Creek, Mich.
Truck, fork lift, 6 ea.—$33,906

CUSHMAN MOTOR WORKS, INC., Lincoln, Nebr.
Motorscooters, 7 ea.—$6,991

FORD MOTOR CO., Jersey City, N. J.
Sedans, 8 ea.—$15,784

FORD DIV., FORD MOTOR CO., Washington, D. C.
Trucks, various, 6 ea.—$10,897

GENERAL MOTORS CORP., CHEV. MOTOR DIV., Detroit, Mich.
Trucks & Busses, 5 ea.—$22,054

GENERAL MOTORS CORP., CHEV. MOTOR DIV., Detroit, Mich.
Pickup trucks, 120 ea.—$192,315

HELIO AIRCRAFT CORP., Norwood, Mass.
Aircraft, 1 ea. & 2 jobs,—$45,632

INTERNATIONAL HARVESTER CO., Washington, D. C.
Trucks, various, & busses, 5 ea.—$23,-021

MEDICAL COACHES, INC., Oneonta, N. Y.
Mobile Medical Clinics, 2 ea.—$25,098

MERCURY MFG. CO. (The), PETTIBONE MULLIKEN CORP., Chicago, Ill.
Forklift trucks, 56 ea.—$244,808

MERCURY MFG. CO., (The), Chicago, Ill.
Warehouse Tractors, 2 ea.—$6,568

PIPER AIRCRAFT CORP., Lock Haven, Pa.
Airplane, piper, 2 ea.—$21,365

STUDEBAKER-PACKARD CORP., South Bend, Ind.
Pickup trucks, 4 ea.—$7,458

STUDEBAKER-PACKARD CORP., South Bend, Ind.
Sedan deliveries, 4 ea.—$8,125

THEW SHOVEL CO. (The), Lorain, Ohio
Truck mounted crane, 1 ea.—$104,386

H. P. TOWNSEND MFG. CO., West Hartford, Conn.
Machine, Milling, 4 ea.—$27,564

UNION CARBIDE CONSUMER PRODUCTS CO., DIV. UNION CARBIDE CORP., New York, N. Y.
Battery, Dry, 34,560 ea.—$57,612

WILLYS MOTORS, INC., Toledo, Ohio
Trucks, various, 302 ea.—$645,935

Circle 156 on Inquiry Card for more data

Circle 157 on Inquiry Card for more data →

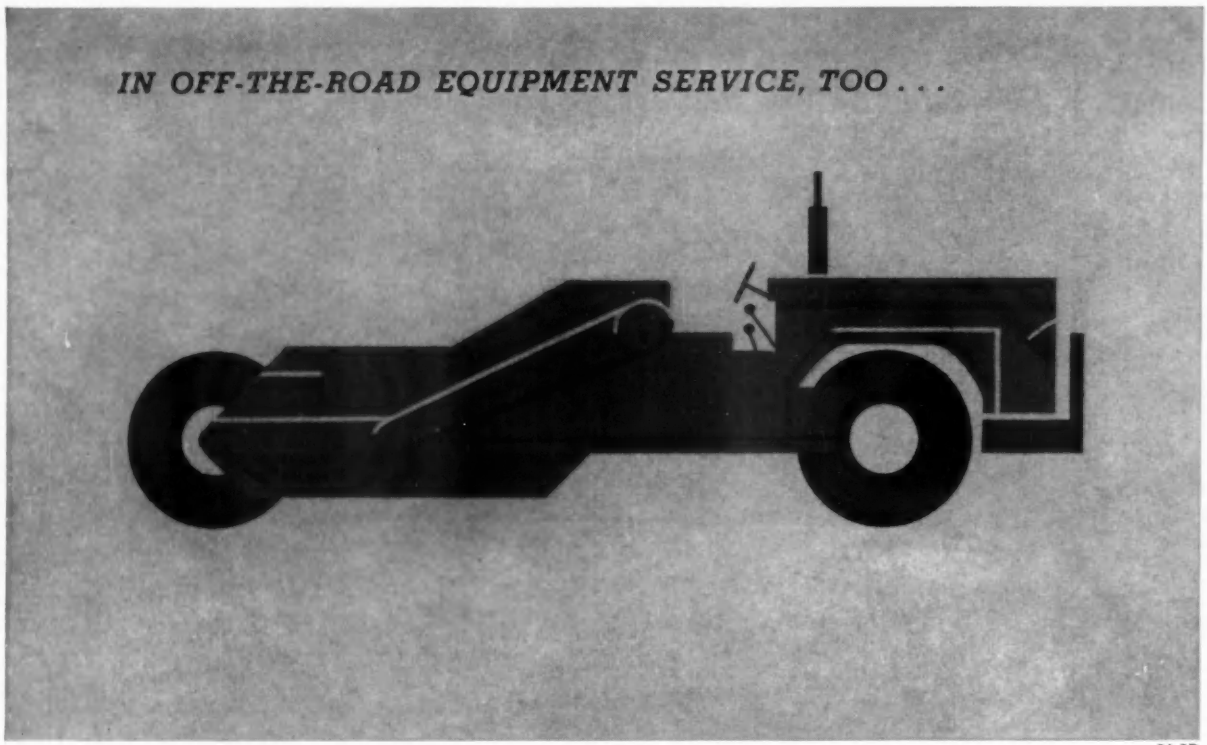
stainless steel adds sales appeal.

the car designed with stainless steel looks better when you buy it and is worth more when you sell it.

McLOUTH STAINLESS STEEL

McLouth Steel Corporation · Detroit 17, Michigan

Look for the **STEELMARK** on the products you buy

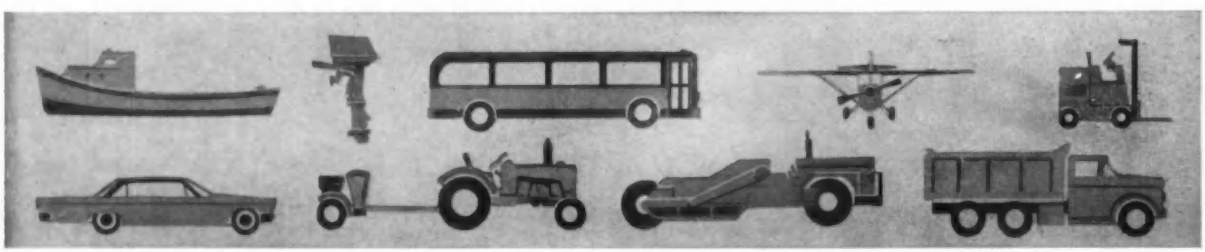


61-2D

special tools: Rx for measuring movement

It's a foolhardy hard hat who tempts fate and risks fingers to determine RPM of power equipment with a standard tach. Particularly since Kent-Moore introduced Uni-Tac . . . the first accurate, low-cost, portable—and safe! —strobe tach for field use.

Special tools like Uni-Tac make field service safer . . . safer for mechanics, safer for fragile parts. But that's not all. The special tool way is the fast way, too . . . and the low-cost way. In short, the *right* way. Small wonder more and more manufacturers of all shapes and sizes of power equipment are turning to Kent-Moore for special tool solutions to special service problems. Over 40 years, K-M has developed 3000 off-the-shelf tools. Or the just-right tool can be designed and built *special* for you. Just call and see.



KENT-MOORE ORGANIZATION, INC.

28635 MOUND ROAD, WARREN, MICHIGAN • ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT

Circle 158 on Inquiry Card for more data

NEW BORG & BECK 12-INCH CLUTCH FITS INTO 11-INCH BELL HOUSING

Packs More Muscle for School Buses, Medium-Duty Trucks, Diesel Conversions

Now—for the first time—you can get greater load capacity in school bus and truck clutches, without changing flywheel size, housing, motor mounts or pedal linkage.

This new Borg & Beck 12A5 clutch mounts on the same flywheel bolt circle, in the same size housing, as B&B Type 11A8—yet provides substantially more load capacity. And that means longer life, more engagements, more miles of on-the-go service under punishing stop-and-go operation.

Already adopted as original equipment by two leading school bus and truck makers, Type 12A5 is also the answer for stepped-up capacity in replacement service. And it's recommended, too, for conversions from gasoline to diesel operation.

Like all Borg & Beck clutches, the new Type 12A5 is designed, engineered and built to B&B's leadership standards for quality, performance and value. That's your dependable assurance of complete satisfaction.

BORG & BECK CLUTCH — THE STANDARD
Reg. U.S. Pat. Off.

BORG & BECK
B-W
DIVISION
BORG-WARNER

BORG & BECK®

THE AUTOMOTIVE STANDARD FOR NEARLY 50 YEARS

BORG & BECK DIVISION, BORG-WARNER CORPORATION, CHICAGO 38, ILLINOIS

Export Sales: Borg-Warner International, 36 S. Wabash, Chicago 3

Circle 148 on Inquiry Card for more data

The All-New Ford Fairlane

(*Continued from page* 80)

the tappet face has a spherical "radius" to provide tappet rotation and eliminate spot wear. Five replaceable, pressure-lubricated, steel-backed bearings support the camshaft. Driven by silent chain from a crankshaft sprocket, the camshaft also drives the oil pump and ignition distributor through an integral gear; and the fuel pump through an eccentric cam.

Longer valve stem guides result in reduced valve guide wear and better valve seating.

The valve train arrangement incorporates stud-mounted, shell molded malleable iron rocker arms.

The cam-ground pistons are made of aluminum alloy, with steel inserts for dimensional stability, tin-plated for greater wear resistance. Pistons are fitted with three rings—two specially-finished, chrome-plated cast iron compression rings and a three-piece, phosphate-coated oil control ring.

The crankshaft is precision molded and has five mail bearings. Main bearings are replaceable, steel-backed, copper-lead type. A bolt-on sheet metal crankshaft pulley, attached to the cast iron hub, incorporates a balance sector; another balancing sector is located on the flywheel.

The front engine cover is of die-cast aluminum with provision for mounting the fuel pump. The integral water pump uses a plastic impeller.

Main bearings, connecting rods, camshaft bearings, valve lifters and cylinder walls are lubricated by precision-drilled oil metering passages which provide a positive pressure feed to all bearings. Rocker arms are lubricated from the hydraulic lifter through the push rods. Large oil drain back holes permit easy flow back to the crankcase.

The replaceable full-flow oil filter, located on the left side of the engine, is easily accessible for service. The filter element is made of highly durable fibrous paper. A special bypass valve re-routes the engine oil to maintain lubrication should the filter become clogged.

1962 Fairlane Engines

	Six	V-8
Bore (in.)	3.50	3.50
Stroke (in.)	2.94	2.87
Displacement (cu in.)	170	221
Compression ratio	8.7 to 1	8.7 to 1
Bhp (max.)	101 @ 4400 rpm	143 @ 4500 rpm
Torque (lb ft) max.	156 @ 2400 rpm	217 @ 2200 rpm
Carburetor	Single	Dual
Fuel	Regular	Regular

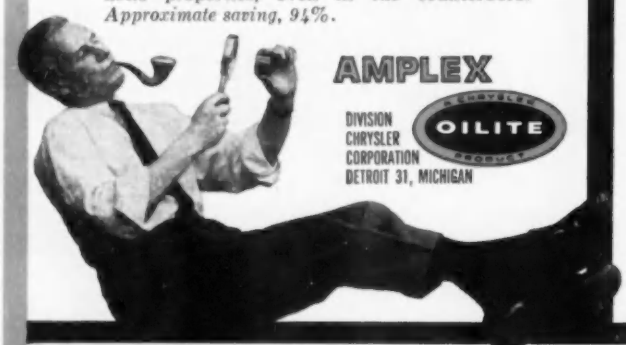
The V-8 engine intake and exhaust manifolds are designed for most efficient engine breathing. Intake manifold branches are equal in length, and characteristics of the cross sections result in uniform fuel-air mixture to all cylinders.

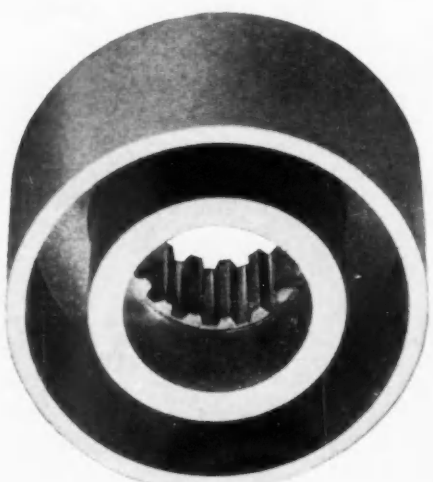
Unrestricted flow of the hot exhaust gases through the center section of the manifold and under the carburetor assures quick warm-up of the fuel-air mixture. An aluminum water-heated spacer, lo-

THE AMPLEXOLOGIST

eliminates the scrap

The part shown is a magnet body for an electromagnetic clutch. Because of the required magnetic properties, uniform wall density is highly critical. Previously, therefore, it was necessary to machine the entire part. The Amplexologist, however, designed it to be produced as a finished, precision powder metal part which requires no machining; and through advanced density control held specified magnetic properties, even in the counterbore. *Approximate saving, 94%.*





AMPLEX
DIVISION
CHRYSLER
CORPORATION
DETROIT 31, MICHIGAN

OILITE

SEND FOR THE SECRET OF THE AMPLEXOLOGIST'S SUCCESS

1 ENGINEERING MANUAL
45 pages of technical information: How to determine correct applications for powder metal parts, bearings, filters.

2 NEW BEARING STOCK LIST
20 pages. 1066 standard sizes of Oilite self-lubricating bearings—bearing material. Selection guide, engineering data.

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Rx for more profits in transportation:

Molded Fiber Glass

GREATEST NAME MOLDED FIBER GLASS IN REINFORCED PLASTICS

Ford truck panels

We prescribe a new concept of materials and design — save weight, tooling time, tooling costs — eliminate rust and corrosion.

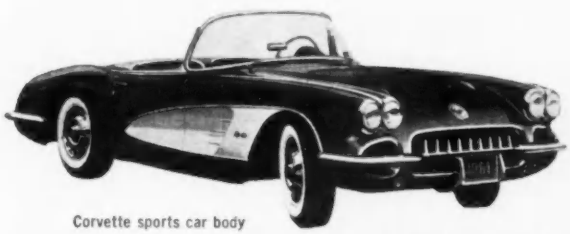
Molded Fiber Glass (MFG) — the structural plastic — is light weight, strong, versatile. Molded under heat and pressure in matched metal dies to produce strong, uniform parts holding close tolerances and dimensions.

(MFG) can custom-mold complete bodies, doors, liners, fenders, moldings, panels — that are light in weight and impervious to rust and corrosion.

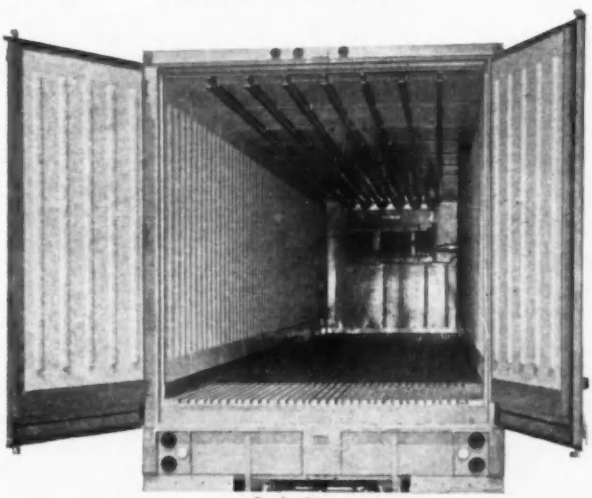
If transportation is your business, (MFG) belongs in your plans — for economy, strength and material superiority. Tell us your problem and we'll help solve it; or send coupon for free descriptive literature.

Complete White truck cab

SEE OUR BOOTH AT THE ASBE SHOW



Corvette sports car body



Reefer liner panels

GREATEST NAME MOLDED FIBER GLASS IN REINFORCED PLASTICS

MOLDED FIBER GLASS COMPANIES

4611 Benefit Avenue • Ashtabula, Ohio

Molded Fiber Glass Companies
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Please send literature on Molded Fiber Glass in automotives.
I am particularly interested in _____

Name _____

Company _____

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cated between the manifold and carburetor, further assists in maintaining uniform temperatures and minimum fuel vaporizing at the carburetor throat. An automatic choke is standard on the V-8.

BODY FEATURES — The unitized body has many unusual structural design features. It employs galvanized steel members in the underbody region for corrosion protection, and supplements this with the use of Zincilate zinc-rich primer in other areas such as large panels, inner rocker panel, and quarter panel joints and welds.

One of the major features is the employment of four steel "torque" boxes in the body structure, serving to absorb forces, vibration and torsional effects. They tie the front rails and rear rails to the side rocker rails. Two of these are located behind the front wheels; two are ahead of the rear wheels.

As the front wheels hit a bump, the upward force is absorbed primarily by the front suspension. The effects of this force tend to lift the front rails, but since the front rails are tied to their torque boxes, the tendency is for the box to twist or rotate rather than transmit all this force back through the vehicle. Since the front torque boxes are not connected to the floor pan, the effects of the force are greatly minimized within the passenger compartment.

Rear torque boxes serve a similar purpose except that, for structural reasons, they are connected to the floor pan. Rear suspension forces are absorbed primarily by the leaf spring and rubber bushings.

Heavy gage galvanized steel box section body sills, extending from the cowl area to the rear wheel house, assure body rigidity. Further bolstering the underbody structure is a system of box-section cross members welded into the floor. These members also help to brace the side sills.

Front structural box members, which support the front body superstructure, front suspension, front engine mounts and front bumper, are attached to the torque box. Sturdy bracing is accomplished with a tubular cross-member in the area between the front suspension mounts. A front box member with reinforcement gussets supports the front superstructure and front suspension strut arms.

The rear engine mounting support arms are attached directly to the torsional member. These arms absorb some of the shock, and with the help of the rear engine mount, a tuned cross-member attached to the extended arms, and the torque boxes, engine and transmission motion is isolated from the passenger compartment.

The superstructure of the rear body also has two box sections attached to the rear side sills, with torque boxes serving as dampening torsional members. The box sections are supported by crossbeams, which are integral with the floor and upper body structure.

The forward brackets of the rear leaf springs are attached to the torsional member, absorbing road shock before it enters the side sills.

CHASSIS DETAILS—The front suspension system employs long and

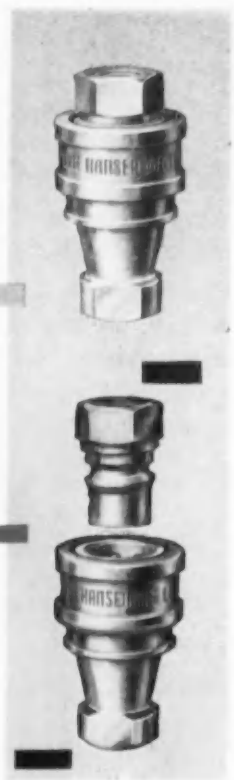
HANSEN

SERIES HK® QUICK-CONNECTIVE

TWO-WAY SHUT-OFF COUPLINGS

QUICK FLUID LINE CONNECTION OR DISCONNECTION WITH INSTANT AUTOMATIC FLOW OR SHUT-OFF

Instantly shuts off both sides of line . . . prevents loss of liquid, gas or pressure



When Coupling is disconnected, identical valves in both the Socket and Plug provide instant shut-off of gas or liquid. To eliminate leakage or spillage during disconnection, the Coupling is so designed that shut-off takes place *before* the Plug separates from the Socket—and *before* the seal of the Socket itself, provided by the Socket "O" Ring, is broken.

In reverse, when Coupling is connected, the "O" Ring in the Socket completely seals Coupling *before* valves release flow of fluid from both sides of line—thus eliminating possibility of spurt of gas or liquid during instant of connection.

Available in brass or steel with female pipe thread connections from ⅛" to 1½" inclusive—also up to 1" in stainless steel.

Write for the Hansen Catalog

Here is an always ready reference when you want information on couplings in a hurry. Lists complete range of sizes and types of Hansen One-Way Shut-Off, Two-Way Shut-Off, and Straight-Through Couplings — including Special Service Couplings for LP-Gas, Steam, Oxygen, Acetylene, etc.

Representatives in Principal Cities . . . see Yellow Pages

SINCE 1915 QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 35, OHIO

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INSPECTION

and

QUALITY CONTROL

you can't beat

MICRO-POISE

MODEL 6780 BALANCING MACHINE

You can't beat its versatility in production either. Besides quick and easy adaptation to a wide variety of work, drill or welding attachments allow on-machine correction in production applications.

MICRO-POISE ENGINEERING & SALES CO.

Balancing Engineers

14851 GRAND RIVER AVENUE, DETROIT 27, MICHIGAN • Telephone: VErmont 8-1134 (Long Distance Area 313)

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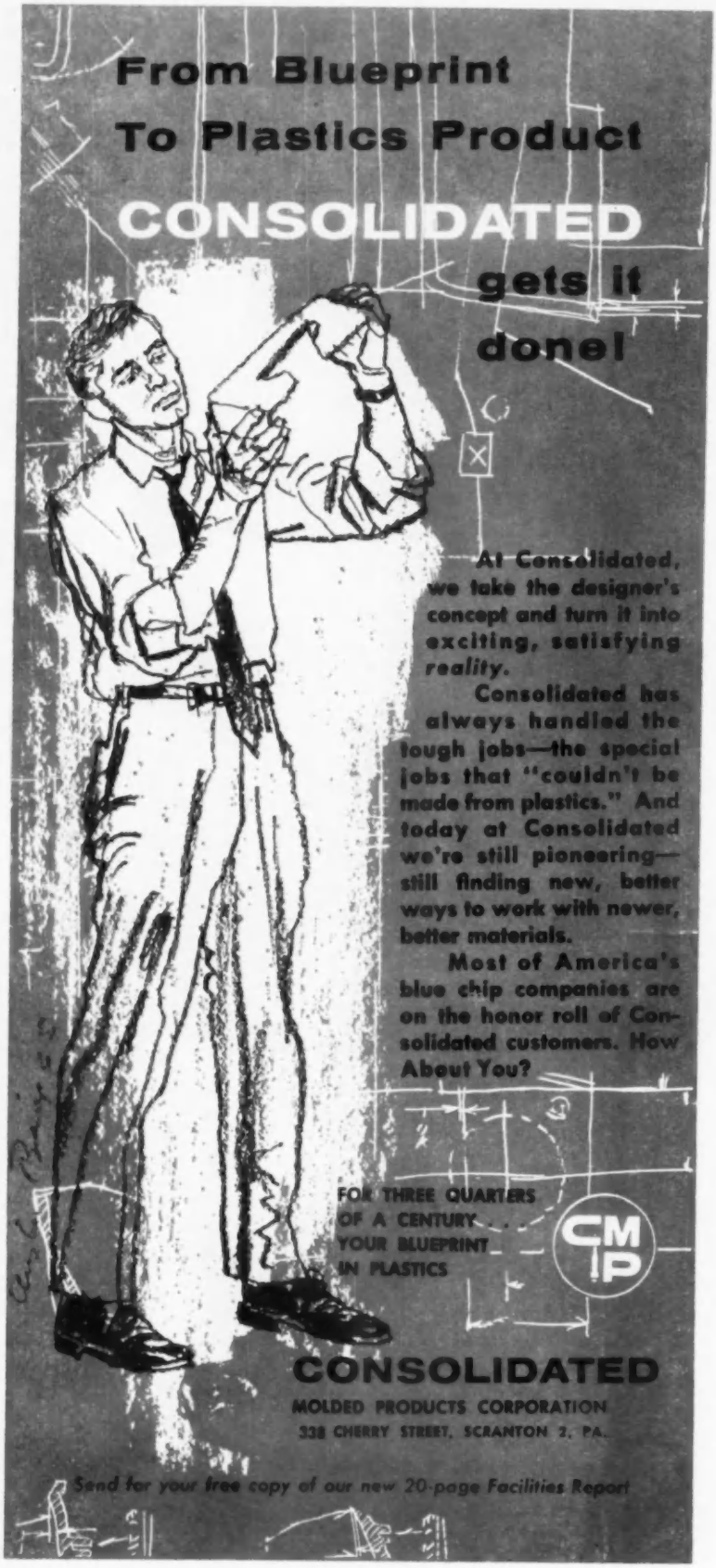

From Blueprint
To Plastics Product
CONSOLIDATED
gets it
done!
At Consolidated, we take the designer's concept and turn it into exciting, satisfying reality.
Consolidated has always handled the tough jobs—the special jobs that "couldn't be made from plastics." And today at Consolidated we're still pioneering—still finding new, better ways to work with newer, better materials.
Most of America's blue chip companies are on the honor roll of Consolidated customers. How About You?
FOR THREE QUARTERS OF A CENTURY . . . YOUR BLUEPRINT IN PLASTICS
CMP
CONSOLIDATED
MOLDED PRODUCTS CORPORATION
338 CHERRY STREET, SCRANTON 2, PA.
Send for your free copy of our new 20-page Facilities Report

short arms, the upper arm being attached to the upper superstructure by two greased-for-life bushings. The lower arm is attached to the lower superstructure and is isolated by silent block rubber. The arms are joined at their outer ends by spring-loaded ball joints which are attached to the wheel spindles.

The Hotchkiss drive rear suspension employs 55-in. rear leaf springs attached by a torsional shackle at the front, a compression shackle at the rear. The front spring bracket is attached at the front to the rear torque box of the body. New U-bolts for the rear springs have a shoulder that controls the torque applied at assembly.

Brakes are of self-energizing, self-adjusting type with a lining area of 165-sq in. Linings are of high-density, high-friction asbestos. Power brakes are available.

Front wheel lubrication period has been extended to 30,000 miles by employing improved seals, and improved type of grease, and an adjusting nut which permits finer adjustment of end-play.

Steering gears is of recirculating ball-nut type with an overall ratio of 27.6 to 1. It employs a flexible coupling for connecting the gear box to the steering column. Power steering, of linkage type, is available.

Rear axle ratios are available as follows: With the Six—3.50 to 1 standard, 3.20 to 1 optional with the manual transmission; 3.20 to 1 standard, 3.50 to 1 optional with automatic drive. For the V-8—3.25 to 1 standard, 3.50 to 1 optional with manual transmission; 3.00 to 1 standard, 3.25 to 1 optional with automatic drive, 3.50 to 1 with overdrive.

Returning to body details, it is noteworthy that insulation and sound deadening have been developed extensively to make the car quiet. The floor pan has been given the full treatment by filling all reinforcing ribs with asphalt deadener, covering the entire area with asphalt deadener, application of a ⅛-in layer of asphalt-impregnated felt, plus a ½-in. amberlite blanket and a ½-in. jute pad. Asphalt mastic also is sprayed onto all inner

(*Turn to page* 128, *please*)

Circle 164 on Inquiry Card for more data

Circle 165 on Inquiry Card for more data ——→

TWO NEW CORROSION GUARDS

UNILOY 430Mo and UNILOY 435Mo STAINLESS STEELS

1962 models of major automobile manufacturers will take to the road with exterior parts produced from two new molybdenum bearing straight chromium stainless steels developed by Universal-Cyclops for maximum corrosion resistance.

UNILOY 430Mo—designed for use where *roping is not a factor.*

UNILOY 435Mo—designed for use where *roping is a factor.*

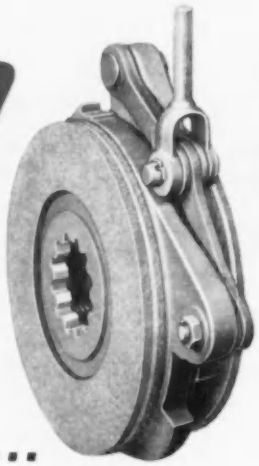
Exhaustive testing by Universal-Cyclops during the development of these alloys—confirmed by laboratory and production testing by automobile manufacturers—has proven that these two new stainless steels not only provide extremely high corrosion resistance, but also, outstanding fabricating and finishing qualities.

These new stainless steels are available with Universal-Cyclops' UNIBRITE finish—buffed beauty both sides. And, in production quantities in a full range of strip sizes. Uniloy 430Mo is also available in wire.

UNIVERSAL CYCLOPS
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE AND REFRACTORY METAL

User-Approved AUSCO Disc Brakes... on the job in all kinds of crops...



Today's farmer depends on modern self-propelled equipment to help him bring in his crop quickly and economically. Whether he's harvesting small grains, corn, cotton or soy beans, it's a good chance his machine is Ausco Disc Brake equipped for safer, surer stopping and steering.

cotton — JOHN DEERE

soy beans — CASE

wheat — INTERNATIONAL HARVESTER

corn — OLIVER

oats — MASSEY-FERGUSON

Leading farm equipment manufacturers such as International Harvester, John Deere, Oliver, Case and Massey-Ferguson use Ausco Disc Brakes because they provide:

1. Greater braking capacity in smaller space.
2. Longer life with less maintenance.
3. Simple, rapid adjustment.

Whether you build combines, tractors, materials handling equipment, paving machines or other types of self-propelled equipment, it will pay you to get the facts about Ausco Disc Brakes and Clutches. Call or write today.

AUTO SPECIALTIES MANUFACTURING CO.

St. Joseph, Michigan

Suppliers to the agricultural and automotive industries since 1908.

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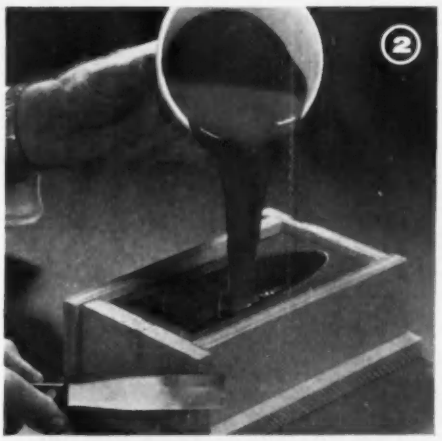
SILICONE NEWS from Dow Corning

Prototypes unlimited



Pour yourself a Silastic RTV mold and . . . start casting!

By using the "original" for a model, you can quickly pour simple cavity or split molds and in a few hours be casting exact duplicates! It's that easy when the mold-making material is Silastic® RTV.

This fluid silicone rubber sets-up at room temperature in minutes or hours depending on the RTV system you select. It cures without heat to a firm, flexible silicone rubber capable of tolerating casting temperatures of many plastics and molten alloys . . . up to 500 F.

Mold making with Silastic RTV is quick, inexpensive and practical — whether you want one duplicate or dozens. What's more, RTV molds produce dimensionally accurate parts having finest hairline detail.

Here are the simple steps followed in producing this taillight lens —

(1) After mixing with catalyst, Silastic RTV is poured into the form, over the original pattern to produce one half of the mold. Because Silastic RTV releases readily from most materials, no parting agent is necessary.

(2) After the RTV cures, the "half-mold" is turned over and alignment notches cut. The RTV surface is coated with release agent and more Silastic RTV poured to form a mating second half of the mold.

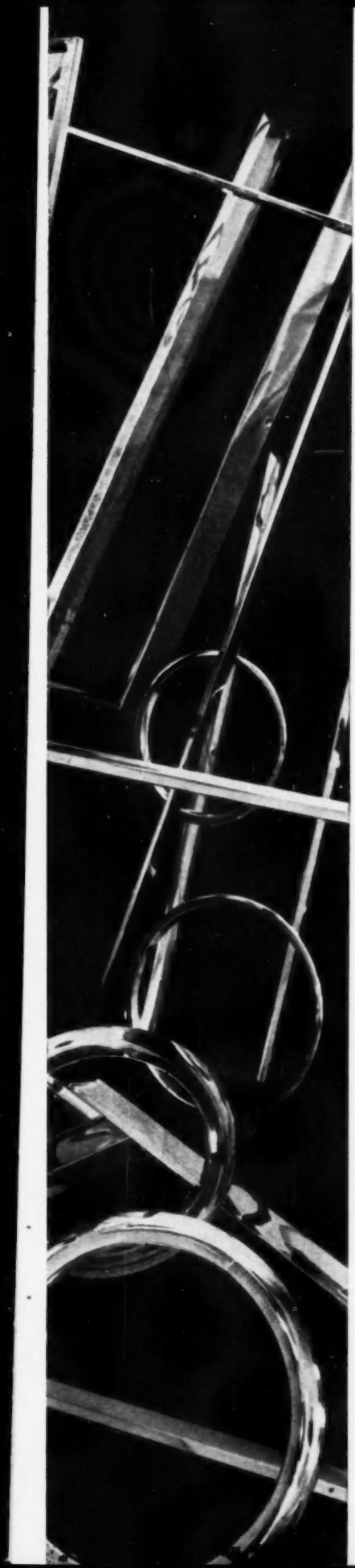
(3) After removing the original pattern, clamp the two RTV molds together, drill sprue holes and air vent — and you are ready to cast prototypes that are exact replicas of the original. The photo shows prototype being taken from the mold.

For detailed information on Silastic RTV, write Dept. 1322, Dow Corning Corporation, Midland, Michigan.

first in silicones

Dow Corning

Circle 167 on Inquiry Card for more data



This is an unretouched photograph of automotive and appliance trim formed of Sharon's bright annealed Stainless Steel. While it loses some of its sparkle in the advertising platemaking process, it gives you some idea of the brilliance of this new Stainless Steel. A detailed pamphlet has been prepared. Write for your copy today.

WHY DESIGNERS LIKE

The brightest, most sparkling Stainless Steels ever developed are creating unusual excitement among manufacturers of our high-quality products. Automotive engineers, appliance designers, furniture people, architects and business machine makers, to name a few, are specifying Sharon *bright annealed* Stainless Steels to a greater degree than ever before. *Bright annealed* Stainless Steel is truly the best looking metal ever made. What's more, it has excellent forming characteristics and improved corrosion resistance, and it reduces or often eliminates buffing operations on high-finish parts. To accent and enhance the appearance of your products, think of the new *bright annealed* Stainless Steels, and when you do . . . think first of the *Sharon Steel Corporation, Sharon, Pennsylvania.*

SHARON *Quality* STEEL

AMERICA'S FOREMOST PRODUCER OF LIGHT STEELS

SHARONSTEEL®

Circle 168 on Inquiry Card for more data

Ford Fairlane

(*Continued from page* 122)

body compartment areas. The hood, of inner and outer panel design, has mastic adhesive spotted between the panels, plus one-inch thick fiberglass panel segments cemented into the inner panel cut outs. All wheel housing and fender aprons are sprayed with asphalt deadener while the front portions of rear wheel housings are fitted with a ½-in. amberlite blanket.

The inner side of the dash is covered with a sandwich consisting of a one-inch thick fiberglass blanket protected on both sides by a ⅛-in. asphalt-impregnated felt lining. The roof panel, including roof quarters, has a ½-in. fiberglass blanket over the sprayed asphalt mastic.

All cars are fitted with attachments for seat belts. Another important safety feature is a new type of door lock introduced on Fairlane this year. The door latch assembly is of yoke type with dual grip arms. The lock striker is unique, consisting of a solid pin with a flanged cap, attached to the door pillar. When the door closes the yoke centers over the striker pin and locks securely in position. The rubber shock bushing over the pin serves to cushion closing action and absorbs rattles. ■

Thunderbird

(*Continued from page* 79)

ments to provide for extra rigidity and strength. Besides this insulation and sound deadening have been upgraded materially. Additional sound deadening materials have been applied in the following areas: hood, wheelhouse, dash, instrument panel, floor pan, roof panel and rails, and quarter panels.

Freedom from corrosion is further improved by a triple-stage antirust treatment. First of all there is the use of galvanized steel in the underbody structure. Then the body is dipped in a Zincilate, zinc-rich paint bath to coat all inaccessible areas. And finally there is the primer and paint treatment. ■

Mono Cord
NO SPLICE RINGS
are better because the principle hazard found in ordinary seal rings and belts has been removed by Western's Mono Cord one-piece construction. In addition, dimensional requirements are maintained, quality controlled, and service vastly improved—all at no extra cost.
Don't use a spliced ring for technical seal applications, but profit from nearly 60 years experience—specify Mono Cord rings by Western.
Write or phone for information, literature or a visit by our sales engineer in your area.
Mono Cord
SINCE 1902
WESTERN RUBBER CO.
GOSHEN 9, INDIANA
Molded and Lathe-Cut Rubber Parts for All Industries

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946, AND JUNE 11, 1960 (74 STAT. 208), SHOWING THE OWNERSHIP, MANAGEMENT AND CIRCULATION OF

AUTOMOTIVE INDUSTRIES, published semi-monthly at Philadelphia 39, Pa., for October 1, 1961

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Hartley W. Barclay, King St., Port Chester, N. Y. Editor, Hartley W Barclay, King St., Port Chester, N. Y. Managing editor, Henry H. Roberts, 110 Cornell Ave., Swarthmore, Pa. Business manager, John F. Pfeffer, 3004 Rebel Road, Lafayette Hill, Pa.

2 The owner is: (If owned by a corporation, its name and address must be stated and also, immediately thereunder the names and addresses of the stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.

Holders of more than 1 per cent of the capital stock outstanding of Chilton Company: Mary M. Acton, 260 Sycamore Avenue, Merion Station, Pa.; Mrs. Beulah Fahrendorf, Chateau LaFayette, Scarsdale, New York; Charlotte M. Gray, The Buchanan, 160 East 48th Street, New York 17, New York; Dorothy S. Johnson, Bankers Trust Co., 5th Ave. & 44th Street, New York, N. Y.; Kimberton Hills Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Mabel P. Myrin, 1608 Walnut Street, Philadelphia, Pa.; Mary M. Acton, Surviving Trustee U/W/O Clarence A. Musselman, Dec'd, c/o R. F. Irwin, Jr., 2318 Packard Bldg., Philadelphia, Pa., Beneficiaries, Mary M. Acton and David Acton; J. Howard Pew, 1608 Walnut Street, Philadelphia, Pa.; J. N. Pew, Jr., 1608 Walnut Street, Philadelphia, Pa.; Mary Ethel Pew, 1608 Walnut Street, Philadelphia, Pa.; Alberta C. Sly, 415 East 52nd Street, New York 22, N. Y.; Alberta C. Sly, Executrix U/W/O Frederick S. Sly, Dec'd, 415 East 52nd Street, New York, New York, Beneficiaries, Albert C. Sly, Alberta C. Sly, and John E. Sly; Soleil Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Steere & Company, c/o Girard Trust Corn Exchange Bank, Philadelphia 2, Penna.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required by the Act of June 11, 1960, to be included in all statements regardless of frequency of issue.) 17,848.

HARTLEY W. BARCLAY
Publisher

Sworn to and subscribed before me this 5th day of September, 1961

PHILIP J. SHIRE, JR.
(Notary Public, Philadelphia, Philadelphia Co. My commission expires 1/7/63)
[Seal]

Some plain talk about TOUSEY casting sealers

Tousey produces a wide range of Air Dry Casting Sealers with excellent resistance to alkali and oil that offer many advantages to manufacturers of Automotive Equipment.

EPOXY-ALKYD TYPE (our finest)

Here is a slow-curing top quality sealer that will withstand a minimum of 12 months exterior exposure. It has a non-volatile content of 65% and it offers the best mileage at the proper film thickness of any Tousey sealer. It is truly a superlative product.

WATER-BORNE TYPE (our safest)

The vapors in this sealer will not flash. There is no solvent storage problem, it reduces with tap water. It resists most Hypoid Gear Lubricant. Insurance companies and workers alike show preference for this non-inflammable sealer.

RUBBER-ALKYD TYPE
(our most popular seller)

The non-volatile content is 48%, the flash point is above 60°F. It will give twice the mileage of the Lacquer type at comparable film thickness, resulting in a reduced finishing cost per ton of castings. It reduces with Aromatic solvents. Will withstand a minimum of 12 months exterior exposure.

LACQUER-TYPE (fastest drying)

Our fastest drying Casting Sealer with a 20% non-volatile content. Will withstand a minimum of 6 months exterior exposure.

All of the above sealers can be forced dried or baked with no reduction in resistance properties. A brief request on your letterhead will bring further information.

TOUSEY PRODUCTS
CASTING SEALER

TOUSEY VARNISH COMPANY

Chicago Division:
520 West 25th Street, Chicago, Illinois
Quad-Cities Division:
2500 8th Avenue, East Moline, Illinois

Circle 170 on Inquiry Card for more data

Copper as an Alloy in Cast Iron

At a seminar, conducted as part of the First Industry Meeting of producer representatives, the Copper Products Development Association, Inc., and the Battelle Memorial Institute task force discussed the use of copper in cast iron. The purpose of the seminar was to acquaint producers with the scope of the project and to discuss methods of promoting the use of copper as an alloy in cast iron in the United States and Canada.

Dr. Charles H. Moore, Technical Director of the CPDA, acted as Chairman during the seminar. He stressed the magnitude of the task the copper industry has undertaken both here and abroad and reviewed the steps necessary to insure its success. The first of these is a clear understanding of the metallurgy of copper in cast iron. T. R. Baruch, of the Battelle task force, was asked to review this subject.

Metallurgical Role Of Copper In Gray Cast Iron

In order to understand the function of copper in gray cast iron, copper must be considered in its relationship to other alloying constituents. The reason for any alloy additions to gray cast iron is to refine the structure of the base iron with consequent improvement in mechanical properties. A brief review of cast iron metallurgy will explain the reason for this.

Cast iron differs from steel in that the steel matrix determines the properties of a given steel. Cast iron has graphite flakes distributed throughout its matrix which, of course, disrupt the continuity. This graphite is a result of the high carbon content of gray cast iron. For example—the average cast iron contains 3 per cent to 3½ per cent carbon as compared with the average steel containing 0.2 per cent to 0.5 per cent carbon. Terms which are used in the cast iron industry such as ferrite, pearlite, bainite, martensite and austenite are all terms used to describe the different cast iron matrix structures. Whether the graphite is in the form of nodules or flakes, stringers or some other shape is dependent upon melting temperature, type of alloying constituents, cooling speed and nucleation. A too rapid cooling speed or a composition that is deficient in alloying elements will promote the formation of cementite (iron carbide) rather than graphite. Cementite is a hard and brittle phase, very undesirable in applications where subsequent machining is required. The presence of cementite as an otherwise graphitic cast iron is known in the foundry industry as "chill." During the cooling phase of cast iron there is a point at which simultaneous separation of the matrix structure and graphite proceeds. Copper is a mild graphitizer during this stage of solidifi-

(*Turn to page* 138, *please*)

Sterling Piston in the Spotlight!

For long range economy and peak performance, Sterling pistons have no equal. They are used by discriminating builders of engines for both passenger cars and trucks. But pistons account for only a part of our over-all production, which also supplies the aircraft, appliance, building, electrical equipment industries and other diversified items for the automotive industry.

In fact, with an annual capacity of 110,000,000 pounds of permanent mold aluminum castings, Sterling is ready to serve the needs of all industry through its decentralized midwestern plant locations.

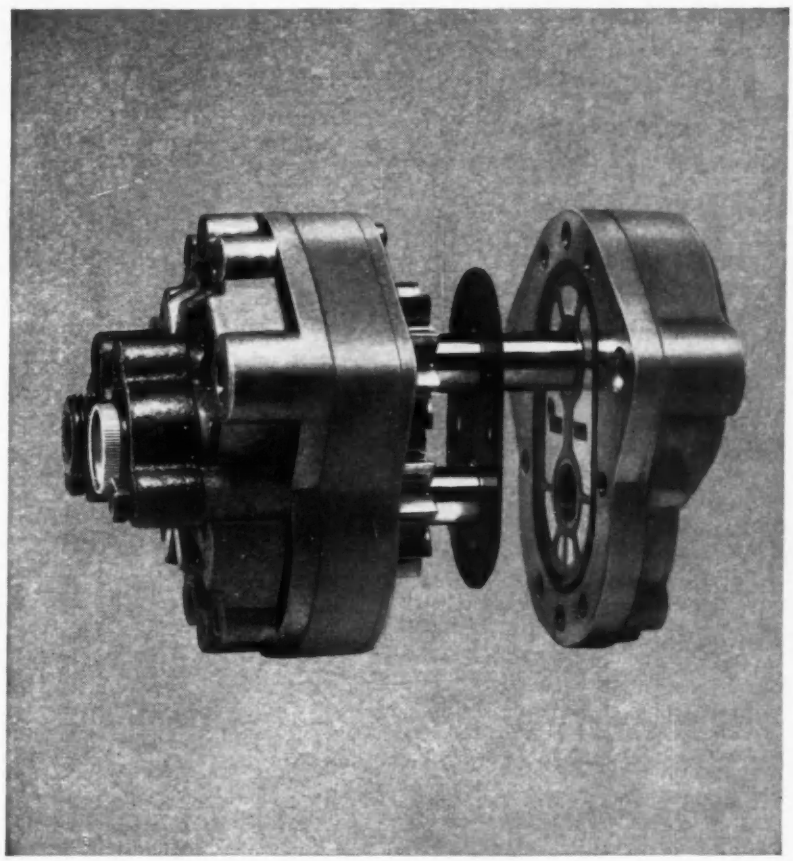
Whatever your problems, we will give you complete engineering service and the fine quality control for which we've been famous for 40 years.

WRITE TODAY FOR COMPLETE INFORMATION

STERLING ALUMINUM PRODUCTS, INC.
ST. CHARLES, MO.

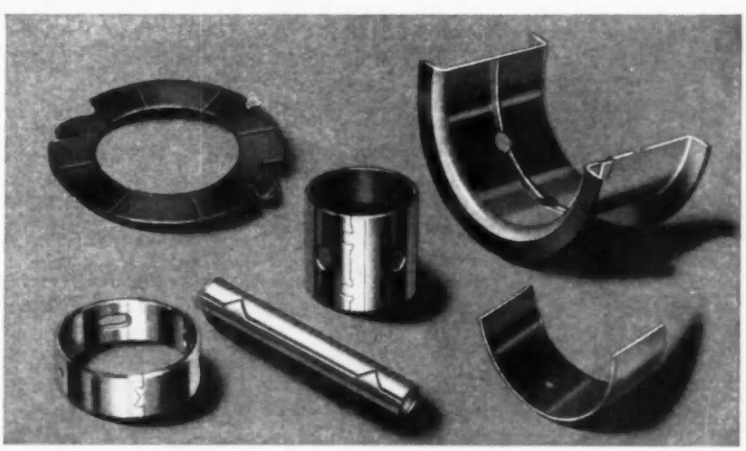
Circle 171 on Inquiry Card for more data

F-M WEAR PLATE "RIDES HERD" ON TURBULENT PRESSURE



IN CESSNA'S NEW HYDRAULIC PUMP LINE, F-M WEAR PLATE DIAPHRAGMS KEEP FLUIDS IN LINE to deliver pressures up to 2000 psi for aircraft, farm and construction equipment, many other hydraulic applications. These wear plate diaphragms maintain positive contact with gears to assure high, uniform pressure. To provide a bearing surface for this job, Federal-Mogul applies a high-density bronze to steel by a special sintering process. F-M high-density bronze prevents fluid absorption, and it affords good lubricity, needed because some hydraulic fluids are poor lubricants. To further prevent the escape of hydraulic fluid, these F-M diaphragms are manufactured for a snug, close-tolerance fit in the pump housing.

THE COMPLETE LINE of products from Federal-Mogul Division includes sleeve bearings, bushings, spacers, thrust washers, as well as wear plates. Through the years, F-M has amassed a wealth of knowledge and experience . . . from constant research, from solving bearing design problems for all kinds of products. Our engineers are ready to put this know-how to work and tailor bearing products to your requirements . . . with top performance assured.



A DESIGN GUIDE provides valuable engineering data for designers on F-M thrust washers as well as wear plates. Also available is literature on sleeve bearings, bushings and spacers. For your copies, write Federal-Mogul Division, Federal-Mogul-Bower Bearings, Inc., 11037 Shoemaker, Detroit 13, Michigan.

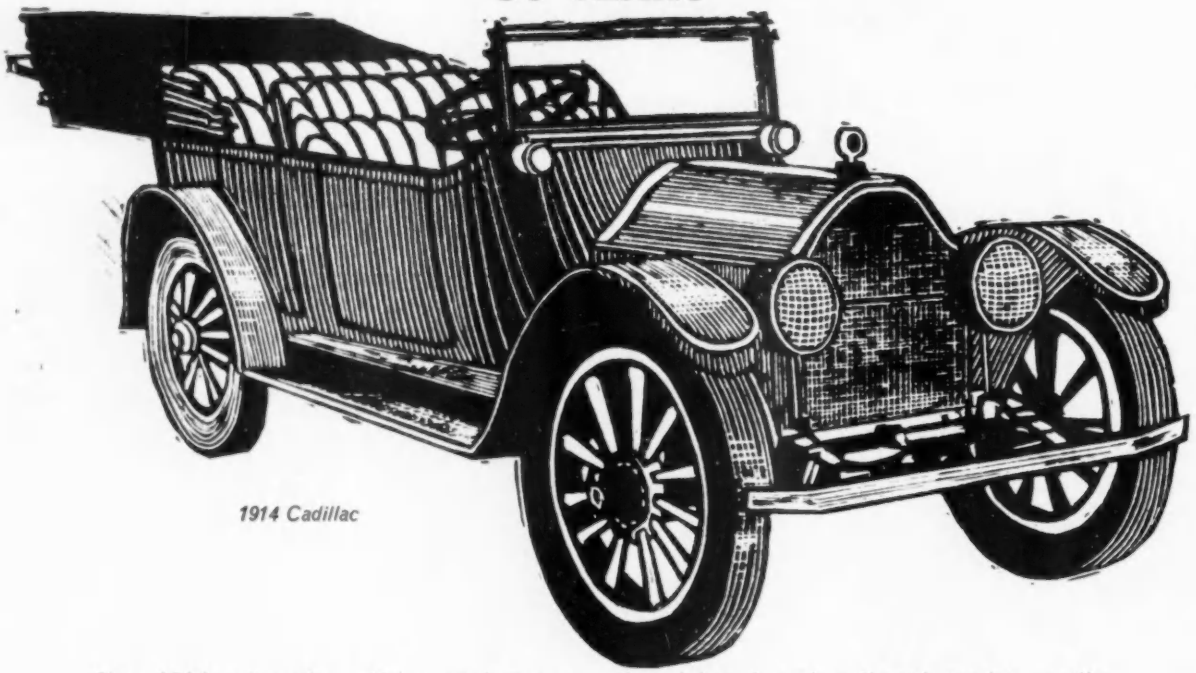
FEDERAL-MOGUL

sleeve bearings
bushings-spacers
thrust washers

DIVISION OF
FEDERAL-MOGUL-BOWER
BEARINGS, INC.

Circle 161 on Inquiry Card for more data

BENDIX... FIRST NAME IN STARTER DRIVES FOR ALMOST 50 YEARS



1914 Cadillac

Since 1914, automotive vehicle manufacturers . . . and their customers . . . have relied on the dependability of Bendix® Starter Drives. Today, they are specified the world over for trouble-free operation and long service. Whatever the internal combustion engine—aircraft, locomotive, inboard and outboard marine, earth movers—you'll find Bendix Starter Drives are first choice. For compact engine designs, Bendix now offers new, positive-engagement Roller Clutch Starter Drives with an over-run feature. Eclipse Machine Division, Elmira, N.Y.

Bendix-Elmira

THE Bendix CORPORATION

140,000,000 installations are your assurance that Bendix Starter Drives provide better performance

Clutch Drive | Heavy-Duty Spring Type | Positork® | Folo-Thru® | Rubber Folo-Thru® | Roller Clutch

Export Sales and Service: Bendix International, 205 E. 42nd St., New York 17, N. Y.

Circle 172 on Inquiry Card for more data

Circle 173 on Inquiry Card for more data

Circle 174 on Inquiry Card for more data

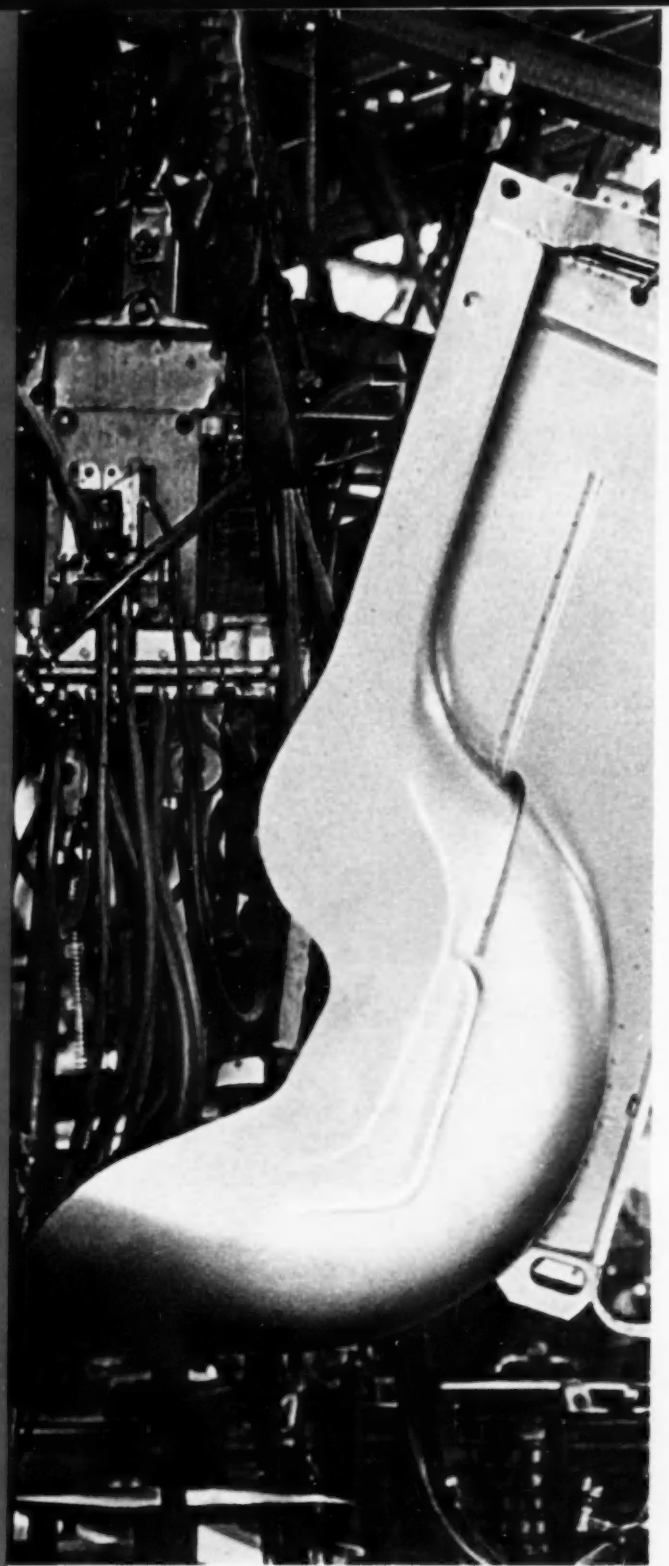
Twenty-five years of engineering experience go into the production of every Evans heater. They're tailored to truck manufacturer specifications . . . custom-engineered to provide the right BTU rating and proper heat distribution *for your specific truck models* . . . and they're designed for quick, easy maintenance!

Backing each Evans heater is a one-year/50,000-mile warranty.

Hallmark of Quality Products . . .

EVANS PRODUCTS COMPANY
PLYMOUTH, MICHIGAN
HEATING AND VENTILATING DIVISION

REGIONAL REPRESENTATIVES: Chicago, R. A. Lennox • Detroit, Chas. F. Murray Sales Co. • Allentown, Pa., P. R. Weidner



DRAW

New Youngstown rolling and annealing capacity means ready availability of higher quality sheet steel

New sheet steel from Youngstown thrives in an atmosphere all its own. In 50 new stack annealing furnaces, Youngstown sheet takes on the exact grain structure and degree of plasticity you need for forming. You get the precise working characteristics required for mild or deep drawing quality.

Quality control in annealing is only a part of Youngstown's sheet story. A modernized 79″ hot strip mill with electronic testing devices and automatic gauge control equipment assures you of more uniform quality steel sheet. This giant mill rolls huge 38,000 pound coils, delivers fewer welds, reduces your coil "down time." Prior to annealing, cold tandem mills reduce thickness to strict tolerances and give the sheet its exacting finish.

Order new Youngstown sheet in widths from 24″ to 72″. Use it in mild and deep draws. Work with it. You'll find it delivers all the qualities you need. Specify Youngstown sheet from 28 Youngstown District Offices or from your nearby Steel Service Center. Specify Youngstown's new annealing process. Specify softness. Or tempered hardness. You can depend on getting precisely what you want, when you choose Youngstown sheet.

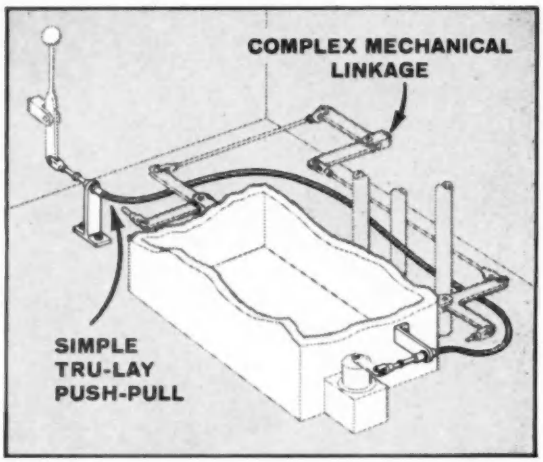
Youngstown – growing force in steel

For full details on Youngstown sheet and annealing write: Dept. 11-D,
The Youngstown Sheet and Tube Company, Youngstown, Ohio

ACCURATE REMOTE CONTROL FOR HUNDREDS OF PRODUCTS

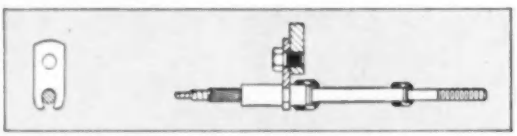
— — with Tru-Lay *PUSH*-PULL Controls

If your products involve remote control—electrical, hydraulic, pneumatic or direct—TRU-LAY PUSH-PULL FLEXIBLE CONTROLS can help solve your design problems. They provide positive remote control over short or long distances—up to 150 feet from the control point. Because they operate while flexing, they can snake around obstructions. They will not buckle. They are ruggedly constructed, easily installed and operated, sealed against dirt and moisture, and will handle jobs with as much as 1,000 lbs. input. PUSH-PULL CONTROLS are simple, have but one moving part, are noiseless and give a lifetime of accuracy. Mechanical linkages, on the other hand, are complex. Unlike PUSH-PULL CONTROLS, they are made of many parts, wear at many points, and produce increased backlash, vibration rattles and lost accuracy.

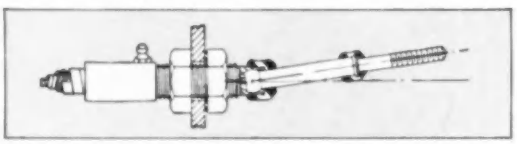


THESE FEATURES HELP SOLVE DESIGN PROBLEMS

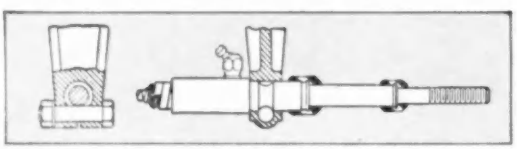
Anchorages



Clip anchorage • a simple clip for light loads

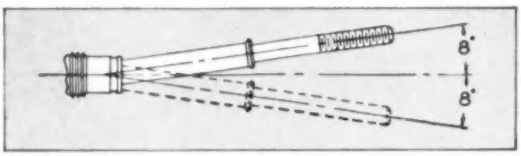


Bulkhead anchorage • for heavy-duty installations



Machined bracket anchorage • can be furnished for mounting any PUSH-PULL cable at the swivel terminal

Swivel Action



Standard assemblies have end fittings with a swivel movement of ± 8° to compensate for misalignment and rise or fall of lever arms. Swivel joints, and the sliding ends, are sealed against dirt and moisture.

PUSH-PULL DATA FILE SHOWS HOW TO SIMPLIFY, IMPROVE DESIGN

• Write for your PUSH-PULL Data File. It contains a complete set of engineering bulletins which describe in detail the operation of PUSH-PULL CONTROLS, their applications, features and advantages.

ACCO

PUSH-PULL CONTROLS

Automotive and Aircraft Division • American Chain & Cable Company, Inc.

601-H Stephenson Bldg., Detroit 2

6800-H East Acco Street, Los Angeles 22 • 929-H Connecticut Ave., Bridgeport 2 Conn.

Circle 175 on Inquiry Card for more data

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

How Alloy Steels Respond to Induction Hardening

In the induction-hardening process, steel is first heated above the transformation range by means of electrical induction, then quenched as required. Special equipment is needed, and heat is developed as follows:

High-frequency alternating current passes through a coil or inductor, with the result that a magnetic field is created in the coil. When the piece to be treated is placed in this field, it is heated rapidly by induced energy. With the various types of induction-heating equipment, the process is capable of surface- or case-hardening to various controlled depths; however, through-hardening can be obtained with certain alloy steels. Ferrous metals that respond well to induction hardening include numerous grades of both alloy and carbon steels, as well as hardenable stainless steel and plain or alloyed cast iron.

As a rule, when alloy steels which contain non-carbide-forming elements, such as nickel, are heated by induction, the usual hardening temperatures can be used. But with alloy steels that do contain carbide-forming elements such as chromium, molybdenum, and vanadium, the hardening temperature must be increased if the normal effect of the alloying elements is desired.

Hardness obtained by the induction process is a function of the carbon content and prior structure, just as it is when conventional heating methods are used. Nevertheless, higher surface-hardness values for a given carbon content have often been noted in parts subjected to surface induction-hardening. The extra hardness may be as much as five Rockwell C points for steels of 0.30 pct carbon.

As pointed out previously, the induction method requires special equipment. However, it possesses several marked advantages, including speed of heating and cleanliness of operation. Pieces heated by induction are usually subject to a minimum of scaling and distortion. Moreover, induction-hardening equipment is very compact and therefore conserves floor space.

If you would care to know more about the induction hardening of alloy steels, please communicate with our technical staff. Bethlehem metallurgists have made a thorough study of the subject, including the many details of quenching and tempering. Call them if they can help you in any way. And remember, too, that Bethlehem makes the full range of AISI standard grades, as well as special-analysis steels and all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Circle 176 on Inquiry Card for more data

SYNCRO

SYNCHRONATION

ESSEX, MICHIGAN

(Advertisement)

SILICOLOGY

Studies in Silicones

HOW THESE TIME-TESTED MATERIALS CAN WORK FOR YOU

Silicones Go Into High Gear... To Back Up the New Car Warranty

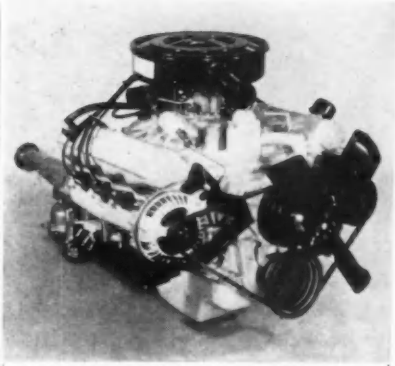
Automobile designers sharpened their pencils for the 1962 models. The new "12-months-or-12,000-miles" warranty calls for much more than a new piece of paper. Needed is the kind of extra assurance that products such as silicones provide to back up performance.

With this new look at quality control, UNION CARBIDE Silicones are becoming more popular with designers, production engineers, dealers, and most important, with customers. Yet these high-performance products usually cost only a few cents more than most of their out-dated counterparts.

SILICONE RUBBER SETS NEW STANDARDS

Silicone Rubber, in various compounds, performs better than organic rubber in many areas. Among other things, it stands up under extremes of heat and cold, yet permits precision molding at favorable fabricating rates.

Silicone rubber sparkplug boots remain unaffected by water, heat—even ozone—for a maximum service life. Other compounds work just as well as dielectric coating on battery terminals and distributor caps. And a special electrically conductive silicone rubber is used as ignition wire core on many models, reducing car radio interference below annoying levels. In transmissions and differentials, silicone rubber seals and gaskets stay on the job in spite of attack from oil, hydraulic fluids, anti-freeze—under conditions of elevated temperature.



CLOSE-UP of engine in Chrysler Motors new 1962 Plymouth series.

LOOK WHAT SILICONE FLUIDS CAN DO

There are an amazing number of places where silicone fluids work to reduce production costs and to boost the performance of the finished car. We can mention only a few.

To begin, silicone anti-foams in coolants and cutting oils keep costly, efficiency-robbing foaming of these agents to a minimum. In the production of tires, rubber floor mats, molded rubber accessories and radiator hoses, there are silicone release agents which help the finished product slip easily and quickly from intricate molds without loss of detail.

In the car itself, silicone damping fluids frequently keep delicate instruments from bouncing around, even when road conditions are extremely rough. In certain cars, variable-speed drive systems for the cooling fans use silicone fluids for powering because these remain stable over wide ranges of temperature. Among other things, silicone fluids are excellent leveling agents for acrylic lacquers . . . all-weather lubricants for car weatherstripping . . . and excellent constant-viscosity lubricants in special applications.

MORE TO COME FROM RESEARCH

There are hundreds of other ways in which silicones are serving the automotive industry. Every day, new uses are coming from research, more are being developed in the laboratory. Perhaps there is a place where your own operation can use them profitably, to improve product performance and production efficiency. We suggest you send the coupon below for further information related to your specific needs.

THE 1962 PLYMOUTH convertible, a new model by Chrysler Motors, features the V-8 Fury engine. Silicone Products are used in many areas to improve reliability, durability, and reduce production costs.

UNION CARBIDE

SILICONES

UNION CARBIDE is a registered trade mark of Union Carbide Corporation.

Silicones Division
Union Carbide Corporation
Dept. JB-0102, 30-20 Thomson Avenue,
Long Island City 1, N. Y.

In Canada: Union Carbide Canada Ltd., Bakelite Division, Toronto 12.

Please send me data on _____

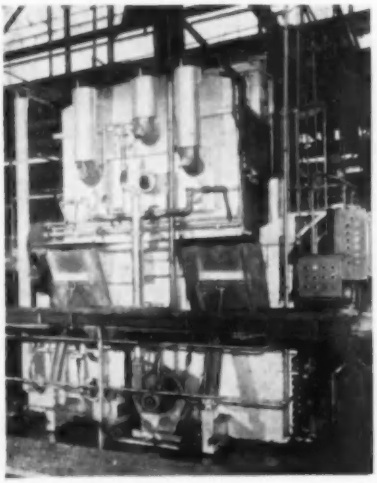
NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ___ STATE _____



HOLCROFT

Production Heat Treating Equipment

For any of these processes:

- ✓ ANNEALING
- ✓ BRAZING
- ✓ CARBURIZING
- ✓ CARBO-NITRIDING
- ✓ CARBON-RESTORATION
- ✓ FORGING
- ✓ HARDENING
- ✓ SINTERING
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44 YEARS OF ENGINEERING LEADERSHIP
Circle 177 on Inquiry Card for more data

Copper in Cast Iron

(*Continued from page* 130)

cation and hence a desirable alloy addition for producing the required flake graphite.

The following table indicates the relative graphitizing value of the more common alloying elements:

Element	Relative Graphitizing Value
Silicon	+1.0
Nickel	+0.35
Copper	+0.30
Manganese	−0.25
Molybdenum	−0.35
Chromium	−1.20
Vanadium	−1.0 to −3.0

It is apparent that silicon is the best graphitizing agent and it is, of course, a constituent in all cast irons. Silicon cannot always be used alone, however, especially in light sections since it tends with relatively rapid cooling to coarsen the graphite and increase the shrinkage of the casting. Copper and nickel when used in conjunction with silicon refine the graphite and reduce the shrinkage.

Solidification of an iron casting may take the following steps—first, austenite is formed which breaks down into either ferrite and pearlite, or ferrite or pearlite. Since a uniform, homogeneous structure with random flake graphite distribution yields the best casting, any additive which promotes this structure is highly desirable. Copper is an anti-ferritizer and promotes the formation of pearlite. Ferrite (which is relatively pure iron) is the softest and weakest matrix structure in cast iron or steel; pearlite, which is an intimate, finger-like interlocking of ferrite and cementite is harder, stronger and produces a denser iron less susceptible to porosity. In addition, copper has a solution hardening effect on the ferrite phase. Nickel also possesses this property. Obviously the perfect pearlite-graphite structure increases the tensile strength of cast iron.

Molybdenum, chromium and vanadium are the carbide forming elements and produce the greatest increase in tensile strength; however, they also produce "chill" (presence of cementite). The ideal

THROW AWAY THE CONDENSER

SYNCRO ELECTRONIC IGNITION COIL HAS BUILT-IN CAPACITANCE

A coaxially wound, high-distributed capacity aluminum foil winding in the primary of this hermetically sealed coil eliminates the need for a condenser in ignition systems.

HOTTER SPARK

The Syncro Electronic Coil delivers a hotter spark, too: calorimeter tests show that it produces higher energy readings than coils of comparable voltage.

Cost? Comparable to a conventional coil, so you save the cost of the condenser, extra wiring and assembly time.

Syncro Electronic Coils are now standard equipment on hundreds of thousands of single cylinder engines. They're also available on special order for multiple cylinder engines. Best of all, Syncro Electronic Coils are compatible with conventional system design practice.

SYNCRO CORPORATION
OXFORD, MICHIGAN

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(Advertisement)

SILICOLOGY

Studies in Silicones

HOW THESE TIME-TESTED MATERIALS CAN WORK FOR YOU

Silicones Go Into High Gear... To Back Up the New Car Warranty

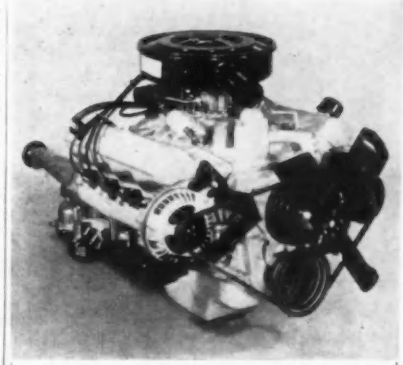
Automobile designers sharpened their pencils for the 1962 models. The new "12-months-or-12,000-miles" warranty calls for much more than a new piece of paper. Needed is the kind of extra assurance that products such as silicones provide to back up performance.

With this new look at quality control, UNION CARBIDE Silicones are becoming more popular with designers, production engineers, dealers, and most important, with customers. Yet these high-performance products usually cost only a few cents more than most of their out-dated counterparts.

SILICONE RUBBER SETS NEW STANDARDS

Silicone Rubber, in various compounds, performs better than organic rubber in many areas. Among other things, it stands up under extremes of heat and cold, yet permits precision molding at favorable fabricating rates.

Silicone rubber sparkplug boots remain unaffected by water, heat—even ozone—for a maximum service life. Other compounds work just as well as dielectric coating on battery terminals and distributor caps. And a special electrically conductive silicone rubber is used as ignition wire core on many models, reducing car radio interference below annoying levels. In transmissions and differentials, silicone rubber seals and gaskets stay on the job in spite of attack from oil, hydraulic fluids, anti-freeze—under conditions of elevated temperature.



CLOSE-UP of engine in Chrysler Motors new 1962 Plymouth series.

LOOK WHAT SILICONE FLUIDS CAN DO

There are an amazing number of places where silicone fluids work to reduce production costs and to boost the performance of the finished car. We can mention only a few.

To begin, silicone anti-foams in coolants and cutting oils keep costly, efficiency-robbing foaming of these agents to a minimum. In the production of tires, rubber floor mats, molded rubber accessories and radiator hoses, there are silicone release agents which help the finished product slip easily and quickly from intricate molds without loss of detail.

In the car itself, silicone damping fluids frequently keep delicate instruments from bouncing around, even when road conditions are extremely rough. In certain cars, variable-speed drive systems for the cooling fans use silicone fluids for powering because these remain stable over wide ranges of temperature. Among other things, silicone fluids are excellent leveling agents for acrylic lacquers . . . all-weather lubricants for car weatherstripping . . . and excellent constant-viscosity lubricants in special applications.

MORE TO COME FROM RESEARCH

There are hundreds of other ways in which silicones are serving the automotive industry. Every day, new uses are coming from research, more are being developed in the laboratory. Perhaps there is a place where your own operation can use them profitably, to improve product performance and production efficiency. We suggest you send the coupon below for further information related to your specific needs.

THE 1962 PLYMOUTH convertible, a new model by Chrysler Motors, features the V-8 Fury engine. Silicone Products are used in many areas to improve reliability, durability, and reduce production costs.

UNION CARBIDE

SILICONES

UNION CARBIDE is a registered trade mark of Union Carbide Corporation.

Silicones Division
Union Carbide Corporation
Dept. JB-0102, 30-20 Thomson Avenue,
Long Island City 1, N. Y.

In Canada: Union Carbide Canada Ltd., Bakelite Division, Toronto 12.

Please send me data on _____

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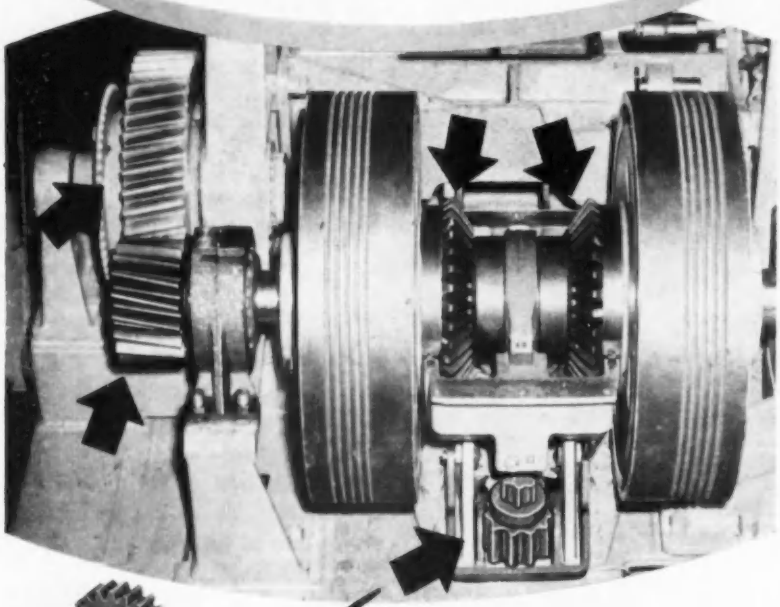
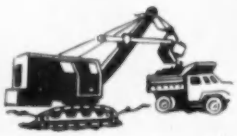
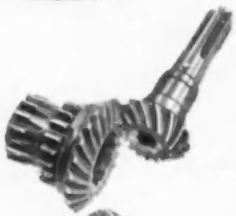
Do You have requirements for "Special Gears?"



CHECK with FAIRFIELD!



"Fairfield has furnished us with bevel and spur gears for many years and we are highly satisfied with their product," states one of America's best known makers of shovels, cranes, and draglines in referring to the above picture. Each gear (*see arrows*) is precison produced to match this builder's specifications for *plus value* quality.



Making gears to meet exacting specifications is our business. The special or unusual requirements you have for design, size, finish, tolerances, materials, and heat treatment are often "standard" at FAIRFIELD. Here, every facility needed is available for production of fine gears EFFICIENTLY, ECONOMICALLY. *LARGE or SMALL, your inquiry will receive prompt attention.* CALL or WRITE.

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2303 South Concord Road • Lafayette, Indiana
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Gears and Differentials Made to Order for:

TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

case would be to achieve the increase in strength without the formation of carbide. Accordingly, other alloying elements are used to balance the carbide formers and still achieve an appreciable tensile strength increase.

The following examples show some formulae which can be used in which copper can balance the carbide formers:

Per cent graphitizer required to balance 0.5 chromium

$$\text{Copper required } \frac{1.2}{0.3} \times 0.5 = 2.0\ \%$$

$$\text{Silicon required } \frac{1.2}{1.0} \times 0.5 = 0.60\%$$

Per cent graphitizer required to balance 0.5 molybdenum

$$\text{Copper required } \frac{0.35}{0.30} \times 0.5 = 0.58\%$$

$$\text{Nickel required } \frac{0.35}{0.35} \times 0.5 = 0.50\%$$

The combination of copper with carbide formers produces a greater increase in strength than would be predicted by the summation of the properties of the individual elements, probably because it reduces the tendency towards segregation of carbides.

Copper also helps increase the Brinell Hardness, reduce the deflection and increase the transverse strength. In addition, copper also has the following beneficial effects:

1—Decreases porosity.
2—Improves machinability.
3—Improves wear and galling resistance.
4—Improves impact, toughness and shock resistance of cast iron.
5—Improves corrosion resistance of cast iron to sulphuric, hydrochloric and atmospheric environments.
6—Copper also has a beneficial effect on certain properties of ductile iron and malleable iron. These will be discussed in subsequent meetings since the quantities of ductile and malleable iron used are much less than gray iron.

Methods Of Making Copper Additions To Cast Iron

There are two methods by which copper may be added to cast iron. It may either be added in the ladle or to the cupola charge itself.

Ladle Additions

1. Copper shot or wire clippings. (In addition to the ladle the size

(Advertisement)

R B & W FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Technical-ities

by Fred E. Graves

Avoiding Bolt Failure Under Dynamic Loads

Dynamic loading in a tightened bolt may vary from no stress at all to that exceeding the bolt preload.

A classic example of dynamic loading is a connecting rod in a reciprocating engine. But you encounter such cyclic stress *wherever* you have fastened members that move or vibrate.

It has been shown that when the fluctuating stress approaches or exceeds actual bolt tension early fatigue failure can be expected.

DEMONSTRATION

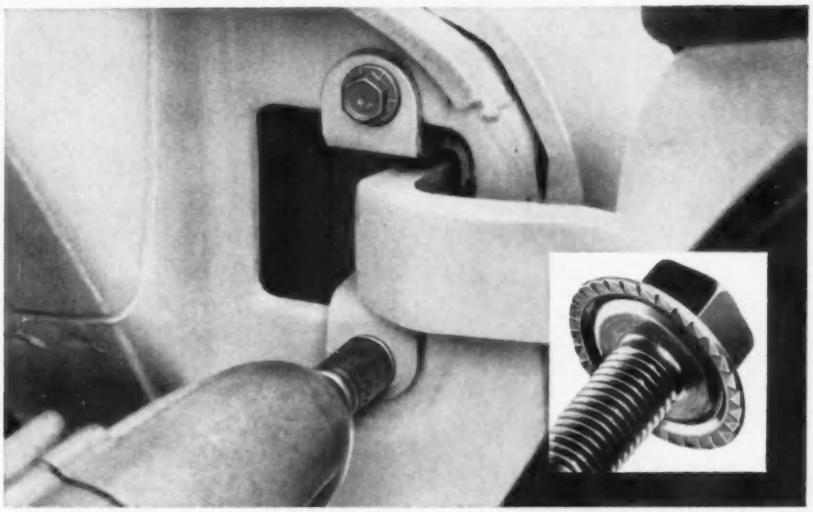
In tests, bolts tightened to a 1420 pound tension and stressed cyclically to 9215 pounds, failed after only 5960 cycles. Identical bolts tightened to 8420 pounds, and cyclically stressed to the same 9215 pounds, went 4.65 million cycles before failing.

Had the bolts been tightened to beyond the 9215 pounds, it would have been impractical to try to cycle them to failure.

So, if you want to avoid fatigue failure, be sure bolt tension exceeds the maximum dynamic load, known or estimated. This way, the bolt's life under dynamic loading will approach its life under static loading.

Take advantage of the high residual tension available to you in today's *high strength* bolts and screws, and thereby avoid fastener failures.

Why Tensilock® screws make ideal fasteners for "double-duty" jobs



TENSILOCK screws are engineered to prevent both *slippage* and *loosening*.

Heat-treated, they are so strong —even stronger in ultimate tensile strength than high-strength hex screws—that they can keep fastened members from slipping by high clamping force. As an added benefit, this permits more liberal tolerance in metalworking operations. Holes in fastened members can be oversize, slotted, eccentric, misaligned.

LOCKED-IN PLACE

Once they're tightened down, Tensilock screws can't shake or vibrate loose under reasonable service conditions. Sharp, angular, carburized teeth beneath their heads bite in to resist counter-clockwise loosening tendencies. To back off, 25% more off-torque is required than on-torque.

SAVES PARTS, TOO

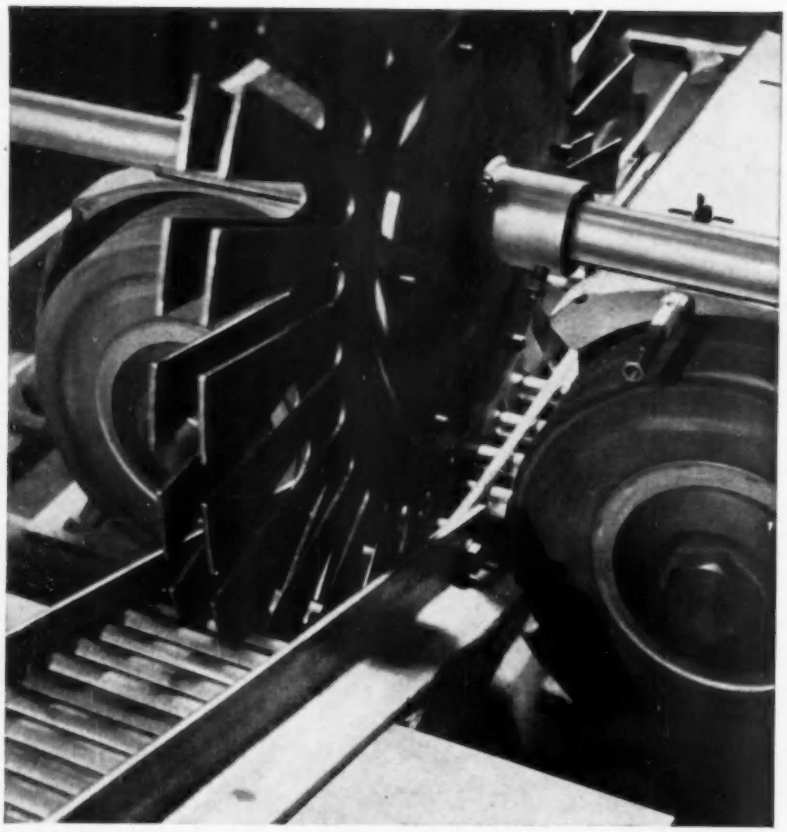
Tensilock screws combine an integral washer with their self-locking feature for a unique one-piece fastener that speeds assembly.

Moreover, with their higher clamping force, it's possible that three Tensilock screws will do the job as well, or better, than four Grade 2 fasteners.

To take advantage of them, we suggest you call in an RB&W technical advisor. Or, write for Bulletin TL-2. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.

Circle 199 on Inquiry Card for more data



SPECIAL POWER BRUSHING MACHINE at Kenmore Machine Products, Inc., Lyons, New York—uses "Ferris wheel" arrangement to index copper tubes past two Osborn 10" TY® brushing heads for deburring and edge-blending. Tubes are rotated through brushing cycle by endless belts. Machine is adjustable for various tube lengths and diameters. Rate for average 1" dia. part: 3300 pieces per hour.

SAVES $20,000 per year

deburring tubing with OSBORN power brushing

Before: this manufacturer of refrigeration components was using off-hand methods to remove end-burrs from rough cut-off lengths of copper tubing. Production was too slow . . . too costly.

Now: this specially-built automatic machine—equipped with Osborn TY® Master® Wheel power brushes—deburrs the tubes quickly, economically . . . edge-blends the tube ends smoothly, uniformly. *Production is over 8 times faster.* Consistently higher quality has eliminated the 100% inspection formerly required . . . *with total savings about $20,000 per year.*

If you are interested in boosting output . . . improving quality . . . reducing costs on *your* metal finishing jobs of every type—deburring, cleaning, polishing, precision blending—an **O**sborn **B**rushing **A**nalysis can show you how. No cost or obligation. Write or call *The Osborn Manufacturing Company, Dept. E-99, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

of copper should be small enough to insure rapid solution in the molten iron.)

Cupola Charge

1. Copper should be added in several pieces to insure uniformity of distribution.

2. Six to ten individual charges weighing from 3 to 5 lb would be required in a 3000 lb cupola charge containing 1 per cent copper.

Foundry Visits

The reactions of the first group of foundries visited in connection with this project were discussed by A. J. Stone and T. Baruch of Battelle Memorial Institute. These foundries and technical organizations were chosen because it was known that they had previous experience with copper and should be able to make the best initial contribution to the study.

The foundries and technical organizations visited were:

1—Gray Iron Founders Society
2—Malleable Founders Society
3—Lanada Iron Foundries
4—Union Carbide Company
5—Mack Trucks, Inc.
6—Lynchburg Foundries
7—James B. Clow & Sons
8—White Motor Company
9—Fremont Foundry
10—Jeffrey Manufacturing Company
11—Ford Motor Company
12—Campbell Wyant Cannon
13—Cadillac Malleable Iron Company
14—Deere & Company
15—Caterpillar Tractor Company
16—Pohlman Foundry Company

Five of the 13 foundries use copper in appreciable amounts, six foundries use very little copper, and two foundries do not use any copper as an alloy in cast iron.

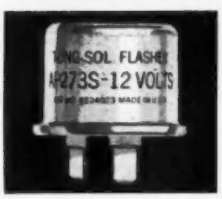
The five foundries using copper are quite satisfied with their results—one will make tests in additional applications.

Of the six foundries using very little copper—two will make tests on new applications, one will use copper if the situation arises and the three remaining do not expect their consumption of copper to increase.

One of the foundries not using copper has no intention of finding new applications at the present time. One foundry will make tests with copper additions to cast iron.

(*Turn to page* 144, *please*)

Now available: the only thermal flasher that meets the new S.A.E. specifications



ONLY TUNG-SOL has succeeded in producing a new thermal-type flasher that meets the J590-61 S.A.E. specifications—the most rigid ever written for passenger car application. This ability to meet the ever-higher requirements of the automobile industry is conclusively demonstrated by the fact that Tung-Sol direction signal flashers are used exclusively for initial equipment by all American car manufacturers.

TUNG-SOL®

TUNG-SOL ELECTRIC INC., NEWARK 4, N. J. TWX: NK 193 — HEADLAMPS • MINIATURE LAMPS • FLASHERS

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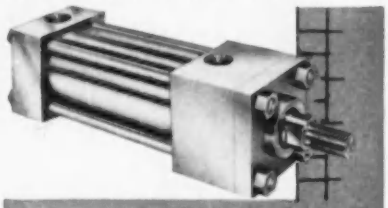
NEW O-M SQUARE-HEAD AIR AND HYDRAULIC CYLINDERS

GIVE THE PERFORMANCE YOU EXPECT... AND MORE



Air—(rated 200 psi)
Hydraulic—(rated up to 2000 psi)
Meet JIC Standards 1 ½" to 14" Bores

- Long Service
- Uniform Performance
- Dimensional Interchangeability
- High Operational Efficiency
- Compact — Saves Space
- Quick, Easy Maintenance

Made of the highest quality materials and seals, these new components combine modern design, the latest and best engineering advancements with O-M specialized "know how" and precision workmanship.

New Series "K" Air Cylinders

Construction features include brass cylinder barrel, chrome-plated, high tensile steel piston rod with a minimum yield strength of 90,000 to 100,000 psi. Rolled and machined steel heads and extra long cartridge-type rod bearing assure perfect alignment of piston rod.

New Series "L" Hydraulic Cylinders

Similar in many construction features to Series "K", but specifically designed for hydraulic service. Incorporate vee-type rod packing and a cylinder barrel of micro-honed steel tubing which are best suited for hydraulic operations.

With the addition of the new Series "K" and "L" to the Ortman-Miller major line of air and hydraulic cylinders, you can now rely on O-M for *all* of your low and medium pressure cylinder requirements.

Mail coupon today for complete details. All cylinders in Bulletins 115A and 116 have been dimensioned in accordance with NFPA recommendations for your convenience.

ORTMAN-MILLER MACHINE COMPANY
17 143rd Street, Hammond, Indiana

☐ Have representative call
Please send Bulletin(s)
☐ 115A—Series "K" ☐ 116—Series "L"

NAME_____
POSITION_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE___ STATE_____

Circle 184 on Inquiry Card for more data

(Continued from page 142)

General Conclusion from Foundry Visits

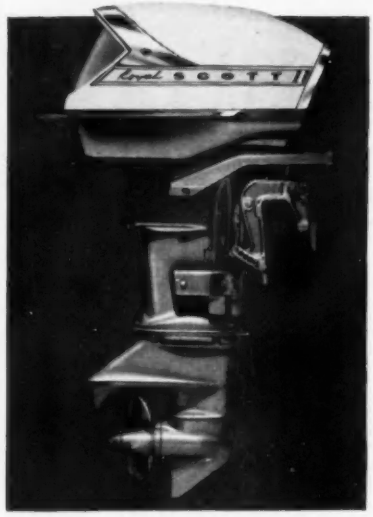
1. Many foundries believed that copper has several advantages, but has not been promoted adequately.
2. Copper produces a definite reduction in chill and increase in uniformity of hardness.
3. Copper produces finer pearlite and less free ferrite in cast iron.
4. The dendritic structure exhibited by other alloyed irons is not apparent when copper is used.
5. Copper additions improve tensile strength, machinability, wear resistance and corrosion resistance of cast iron.
6. Some foundries do not believe that alloy additions are necessary. The inclusion of copper on the critical list during World War II and better design are considered as factors in ultimately reducing the quantities of alloy irons.
7. Some prejudice exists as a result of using copper in excess of the solubility limit or making impure scrap copper additions.
8. Many foundries have little knowledge concerning the effects of copper on the structure and properties of cast iron.

Problems In Presenting Copper To Foundries and Castings Users

A summary of problems associated with selling copper to foundries and castings users was presented by A. Stone of Battelle Memorial Institute. Mr. Stone also discussed methods and forms of copper addition, the characteristics required of technical salesmen and the relative economics of alloy additions.

Some of the selling problems to be overcome are that (1) there is no captive market for copper in this field; (2) there are other alloys which will provide very similar properties to those engendered by copper; (3) the beneficial effects of copper on the properties of cast iron have been known for many years with very little practical application; (4) there has been no promotion of copper since it was placed on the critical list during World War II, and (5) there is no single major producer actively promoting the use of copper, as is the case with other alloys. ■

SCOTT OUTBOARDS



VICTOR-Sealed Right and Tight!

For maximum power output . . . efficient carburetion and cooling . . . tight lubricant retention and water exclusion . . . Scott Outboard Motor engineers specify these typical high-quality Victor gaskets and oil seals:

- **VICTOCOR®** soft-packing, metal-core, cylinder head gasket
- **VICTOPLATE** fiber and synthetic rubber shim gasket
- **CORBESTOS®** steel-core asbestos power head adapter gasket
- **VICTOPAC®** asbestos-synthetic rubber cover plate gasket
- **ASBESTOPAC®** asbestos-synthetic rubber drain cover gasket
- **VICTORITE®** treated plant-fiber packing carburetor adapter gasket
- **Type K31 VICTOPRENE®** limited-space application oil seal for water and bailer pumps
- **Type K4 VICTOPRENE®** dual-lip oil seal for propeller shaft and crankshaft

Marine Power Sealing—a VICTOR Specialty
. . . WRITE FOR CATALOG

In standard gasket and oil seal designs, Victor gives you widest selection in all types. In nonstandard equipment, Victor offers 50 years' leadership in design, development and manufacturing. Comprehensive engineering catalogs supplied free. Victor Mfg. & Gasket Co., P.O. Box 1333, Chicago 90, Ill. Canadian plant: St. Thomas, Ontario.

VICTOR

Sealing Products Exclusively
GASKETS • OIL SEALS • PACKINGS • MECHANICAL SEALS

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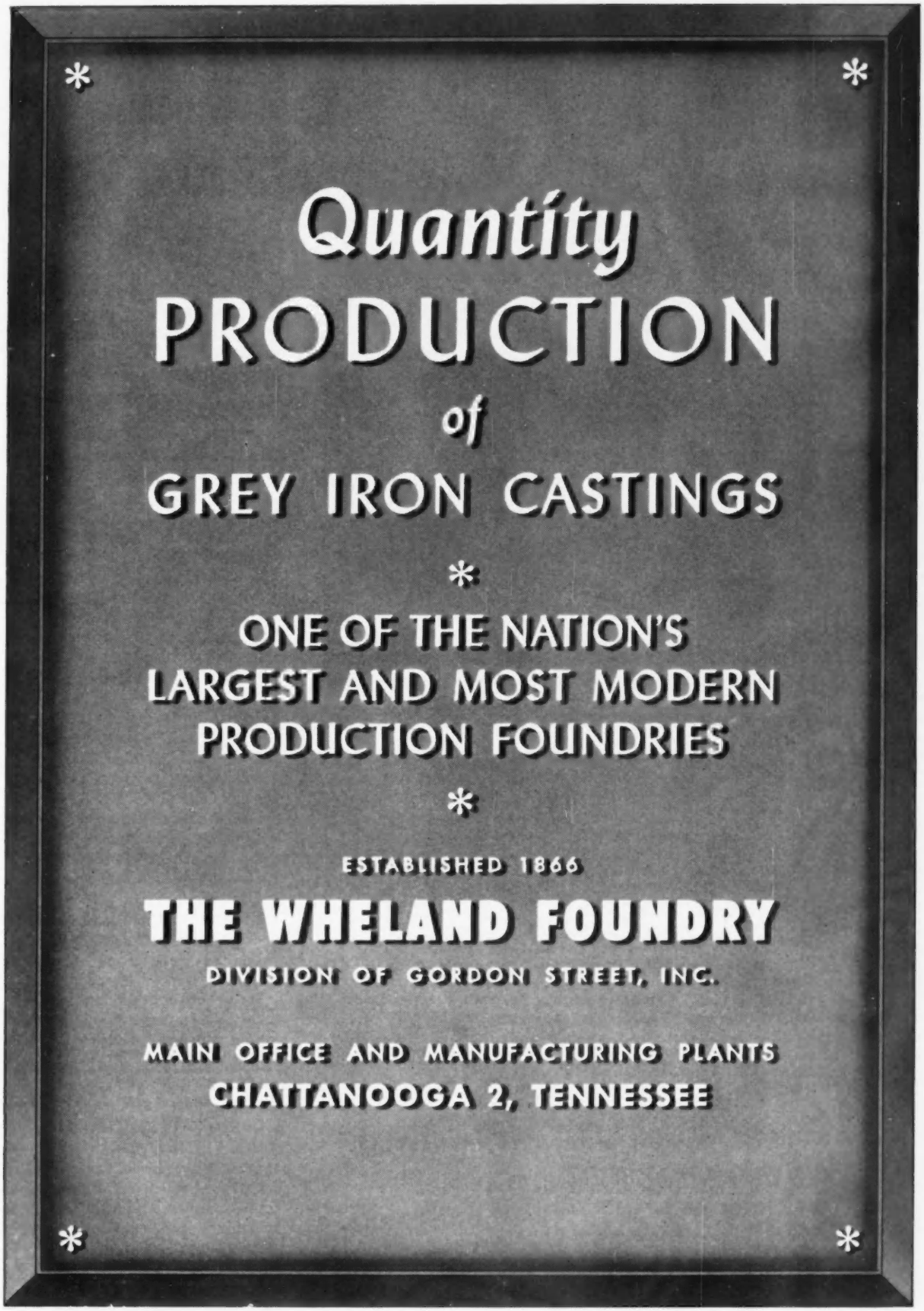

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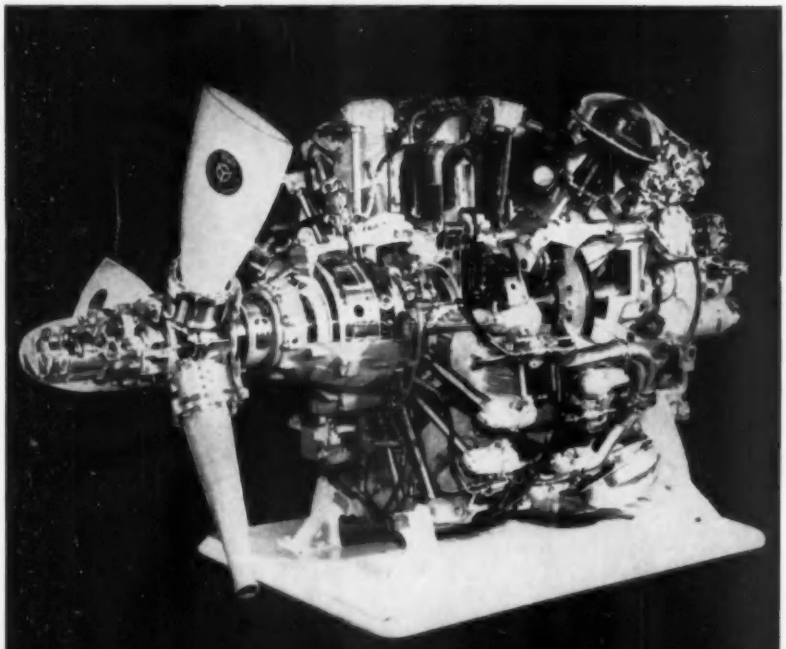
LUBRICATION REPORT

(assembly and run-in)



Application: *Coating piston skirts in aircraft engines.*

Problem: *To avoid damage to pistons during critical run-in period.*

Solution: *'dag'® Dispersion 213 — graphite in an epoxy-resin binder — spray applied.*

RESULT: *HIGHLY EFFECTIVE RUN-IN PROTECTION PLUS EXTENDED PISTON LIFE*

The Wright Aircraft Division of Curtiss-Wright Corporation has devoted much time to the critical run-in for radial, reciprocating aircraft engines. The exacting tolerances of this engine design require perfect friction and heat control under all speed and load conditions during the run-in process. To best satisfy these requirements Acheson 'dag' 213 was specified as the run-in lubricant. 'dag' 213 successfully served in many areas of assembly and run-in because of its protective coating properties, dependably uniform consistency and excellent adhesion. So successful was the application for preventing scuffing, scoring and seizing during run-in that the use of 'dag' 213 has been extended to all models of Curtiss-Wright engines in both their 9 and 18 cylinder categories.

Acheson research has developed an extremely broad line of dry film lubricants to meet the technical and economical in-plant requirements for assembly and run-in applications.

Photo courtesy of Curtiss-Wright Corp.

Check your present assembly and run-in lubricant against what Acheson lubricant specialists can offer you. Send for Acheson Bulletin No. 421. No obligation.

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Sales offices in principal cities.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

Rambler Classic Six and Ambassador V-8

(*Continued from page* 81)

passenger to lower the seat back and raise the cushion in "contour-chair" fashion.

The 1962 Ambassador V-8 is nine inches shorter than last year's model, and now has a wheelbase of 108 inches, the same size as the Rambler Classic Six. Although shorter, the new Ambassador has the same interior dimensions as before. In fact, rear seat leg-room on both the Ambassador and Classic has been increased.

A new Double-Safety brake system with a tandem master cylinder having a separate hydraulic system for front and rear brakes. It is standard on all 1962 Ramblers at no extra cost. Should either front or rear hydraulic systems fail through accident, the remaining system will still operate, thus providing a double margin of safety. (See illustration of master cylinder in AI Oct. 1, page 56.)

Also standard on all 1962 Ramblers are self-adjusting brakes which automatically maintain proper clearance as linings wear. Improved power brakes are optional.

New Classic and Ambassador models require chassis lubrication only every 33,000 miles or three years, compared with the previously recommended 1000-mile servicing.

Recommended engine oil change on 1962 models is at 4000 miles normally, against 2000 miles of past models. Oil filters are now standard on all models.

Automatic transmissions need to be drained only after 25,000 miles, while the manual transmissions never need a fluid change.

The generator, distributor, clutch linkage and steering column shaft are permanently lubricated. ■

Traction Improved

Goodyear Tire & Rubber Co. has announced that Budene, a polybutadiene synthetic, was being incorporated in all its winter tires.

Goodyear officials said the blend of Budene with conventional synthetics improved traction by 16 per cent on ice and by seven per cent on snow.

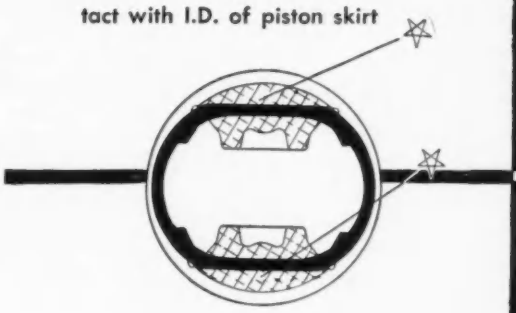
Z EXPERIENCE PROVES THE ENGINEERING LEADERSHIP OF "ZOLLNER PISTON" POWERED ENGINES

Another Zollner Engineering Achievement in Cooperation with Engine Builders

CLEAR-O-MATIC

THE "ALL-TEMPERATURE" CONTROLLED EXPANSION PISTON

STEEL TENSION MEMBER
Anchored only at pin bosses and cast in positive contact with I.D. of piston skirt

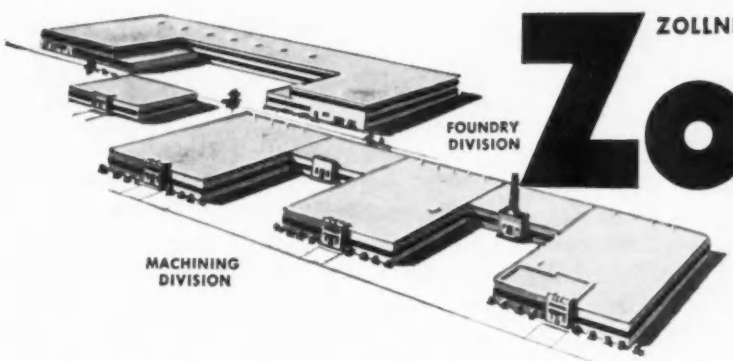


Design adaptable to full skirted or slipper type pistons

Automatically Maintains Uniform Effective Skirt Clearance at ALL Temperatures

COOLER RUNNING
20% greater section for heat conductivity

EXTRA DURABILITY
Greater section above pin bosses provides uncompromised strength for long life



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MACHINERY NEWS

(*Continued from page* 89)

ards for some types of drilling and turning machines are expected to be ready, it is said, later this year.

The program was started about two years ago by a group of 30 users, including automotive representatives. The group is now headed by Harold Cooper of the Chrysler Corp.

As pointed out initially and again mentioned recently, the group in no way intends to restrict or inhibit the design and development of machine tools. The standardization efforts are aimed at areas and dimensional ranges that will permit interchangeability of fixtures and tooling between various makes of like types and sizes of machines.

NATCO Holds Open House, Introduces New Machines

In commemoration of the 60th anniversary of the company's founding, the National Tool Co., Inc., held an open house on September 26 through October 6 in its new and enlarged facilities near Richmond, Ind.

The modern facility of NATCO has a manufacturing area of over 360,000 sq ft, plus an office area of about 40,000 sq ft.

In addition to the company's established lines of multiple-spindle drilling, boring, facing and tapping, as well as plastic injection molding machines, a variety of new machines was presented to the visitors. These included the following:

On display for the first time was the new line of NATCO-DELAPENA induction heat treating equipment. Demonstrated were gear teeth being case-hardened under water.

Another machine exhibited was the new NATCO single-spindle numerical-control machine which has an automatic tool changer capable of handling 32 tools. The changer features fast tool change at random selection without the necessity of coding the individual tools.

A second numerical-control machine was also shown. It is being built by NATCO through a cross-licensing agreement with Ateliers G.S.P. of France. The machine has two spindles and two automatic tool changers. One spindle is heavy for milling, boring and other operations requiring rigidity; and its tool changer can handle 18 tools. The second spindle is designed for high-speed operation in average-size drilling, reaming and tapping; and the tool changer of this spindle can handle as many as 36 tools.

Visitors also saw the new NATCO/JES-CAL honing machines in action. Both the vertical mechanical-feed and the vertical hydraulic-feed machines were demonstrated—the former honing connecting rods within tolerances of 0.0003 in., and the latter honing cylinder sleeves.

The new line of NATCO-DELAPENA vertical and horizontal honing machines was likewise on view. These machines are primarily built for honing long bores with above-average diameters. The vertical machines will handle bores from 2 to 8 in. diam in work up to 5 ft in length. The horizontal hones will handle the same range of bore sizes in work up to 10 ft long. ■

NEW!

Johnson TAPPETS

SKEL KAST

This latest tappet improvement represents still another advancement brought about by the constant search for better design, materials, and manufacturing methods at Johnson Products. The reason? *Better tappets are our only concern.* We welcome the opportunity to put our engineering and test facilities at your disposal. Johnson Products Inc., Muskegon, Michigan.

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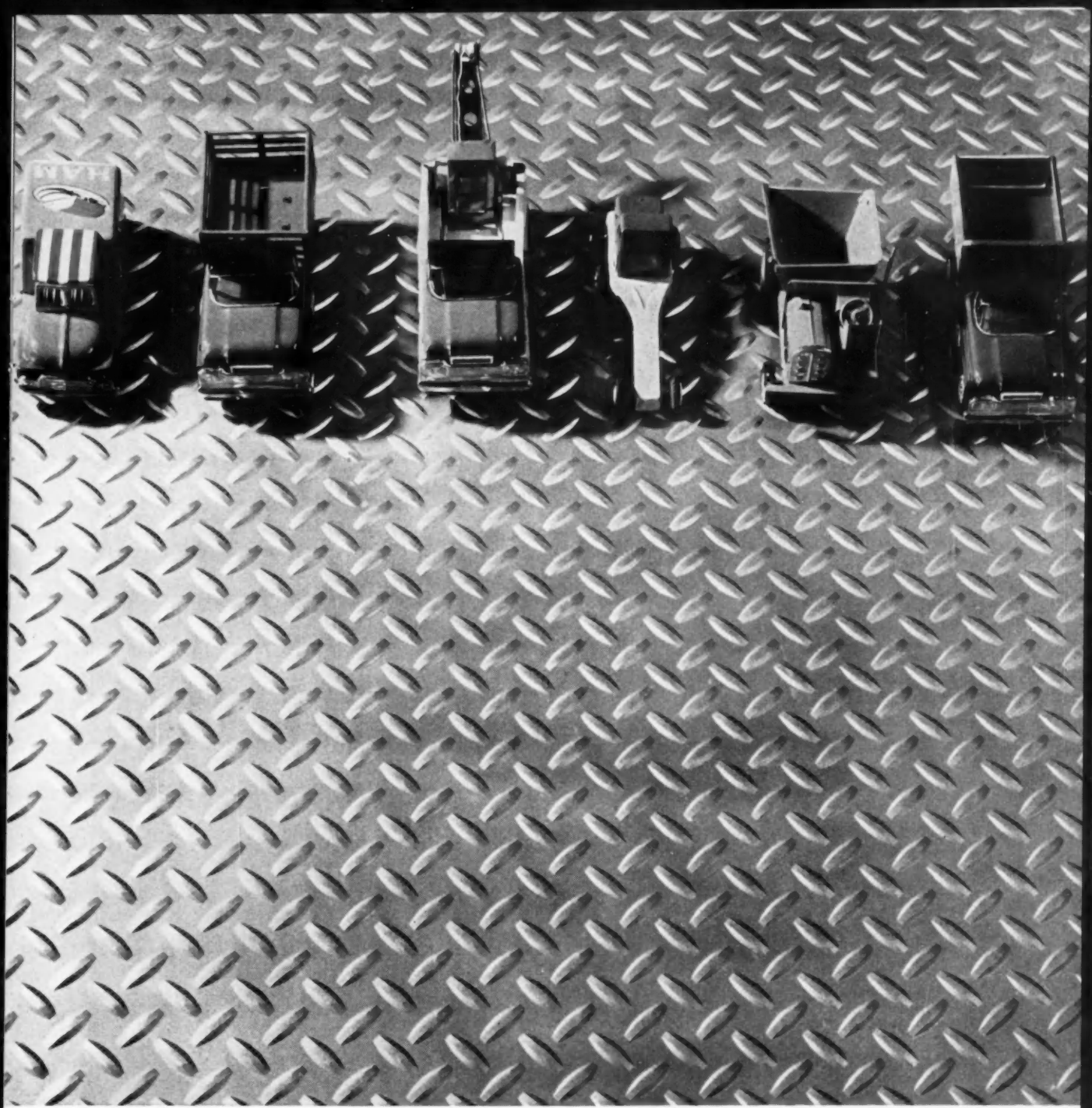

(go-togethers)

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For very good reasons, too. Used on bumpers, tailgates, steps, floors and interiors of trucks and trailers, 4-Way, the tough steel plate with the distinctive raised-lug pattern, adds rugged protection against bumps, scrapes and grinding wear. What's more, it provides safe footing for personnel. Easy to fabricate and install with ordinary shop equipment, it is attractive and remarkably long-wearing. 4-Way Safety Plate comes in three pattern sizes and in thicknesses from 18 gage to 1". Specify it by name... Inland 4-Way Safety Plate. (Get the "63 Practical Ideas" book, 24 pages of ideas for using 4-Way Safety Plate on your trucks. Write to your local Steel Service Center or Inland Steel Company.)

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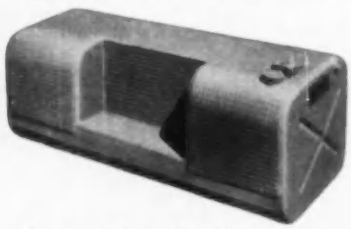

Center Step Tank

The Center Step Tank shown to the left is fabricated of high grade steel with a one-piece center step to insure long life. Center Step Tank also available in aluminum. Center Step capacity—38 to 70 gallons.

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The Snyder Tank Corporation has manufactured over a million safety fuel tanks for all makes and models of trucks that travel on American highways and has maintained its engineering and modern manufacturing facilities to keep in step with the latest trends and requirements of the trucking industry.

Saddle Tank

The Saddle Tank illustrated is designed to transport gasoline and Diesel fuel on a long haul and Snyder's balanced construction insures streamlined yet stronger tanks. Saddle Tank capacity—90 to 145 gallons.

AND SERVICE

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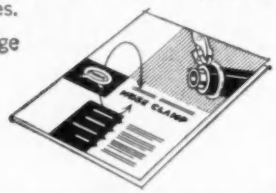

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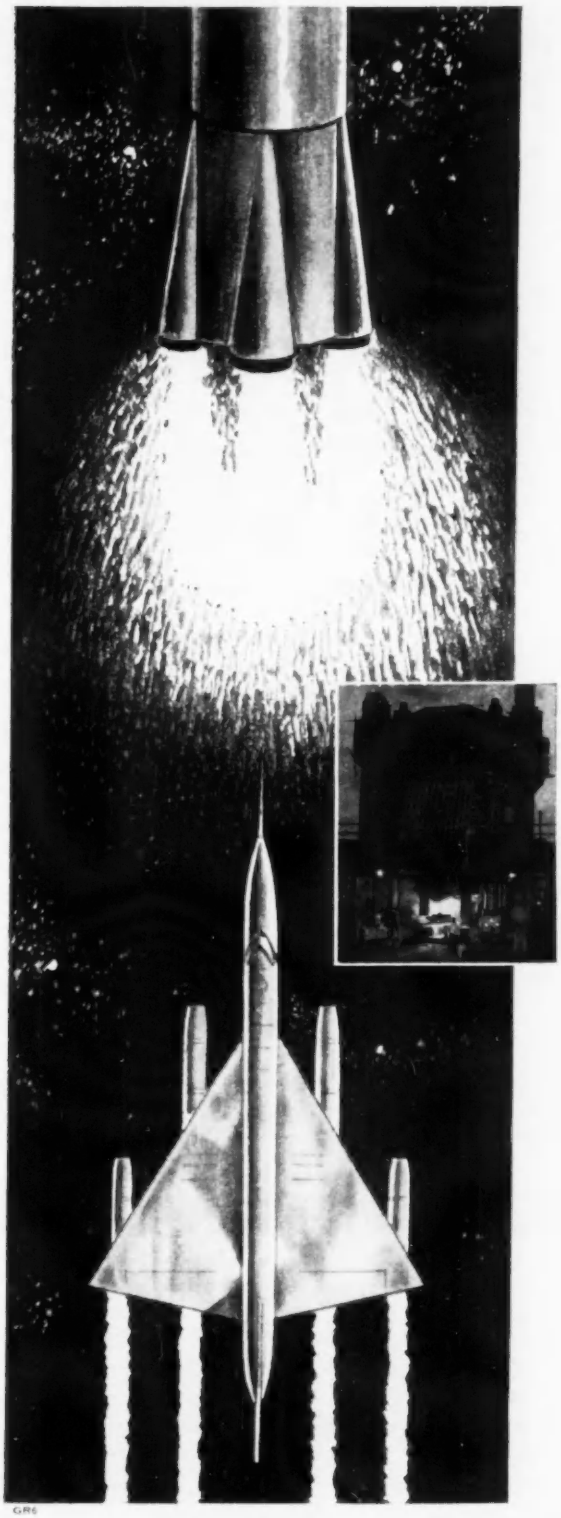

Forging a metal spectrum for any flight environment

Whether design criteria be Mach 2 or escape velocity — the part a wing spar or rocket motor nozzle — most of the significant advances in forging conventional, exotic and refractory materials come from Wyman-Gordon. Here, technical breakthroughs in size, complexity and strength-to-weight ratios of forged airframe hardware and propulsion components have materially raised performance ceilings for every type of vehicle — global bomber to deep space probe capsule. Always impatient with state-of-the-art concepts, Wyman-Gordon engineers and metallurgists constantly explore ways to bring hitherto "unforgeable" metals and alloys into operational use — broadening the spectrum of ultimate-performance materials available for advanced vehicle designs. Consultation on your project requirements can help achieve better correlation of materials to service environment.

CURRENTLY FORGING THESE AERO-SPACE MATERIALS

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Hafnium	Tungsten
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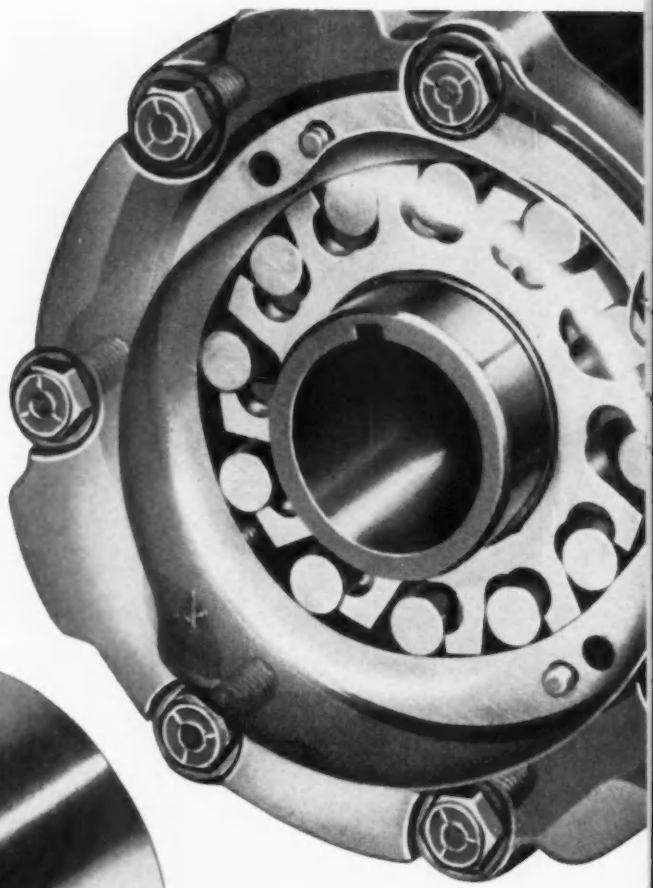
Machining greatly reduced by concentricity of

REPUBLIC ELECTRUNITE MECHANICAL TUBING



CRITICAL PART IN POWER STEERING PUMP made with Republic ELECTRUNITE Mechanical Tubing. Keyed bushing fits over engine crankshaft, provides pump drive for power assist. Close tolerance machining is essential for dual mechanical-hydraulic function.

Precise concentricity of ELECTRUNITE Mechanical Tubing solved a machining problem and cut costs for Eaton Manufacturing Company, manufacturers of power steering pumps.

At the heart of the power steering pump is a bushing made from heavy wall ELECTRUNITE which serves as the internal shaft of the unit. It fits on the crankshaft of the car and drives the power steering pump.

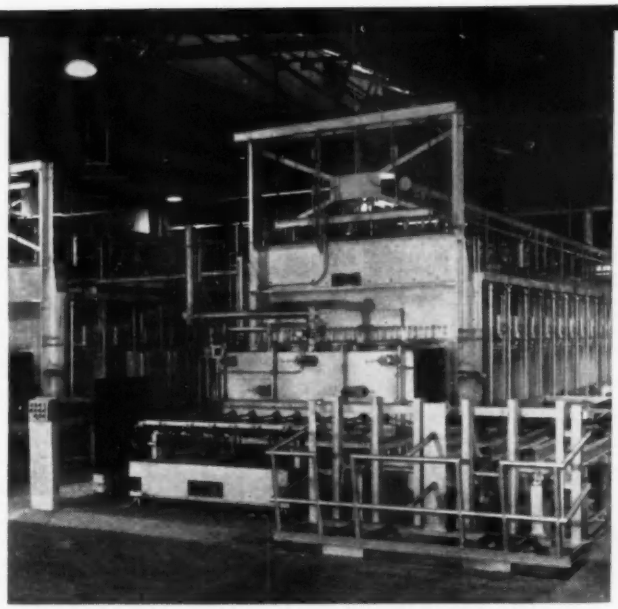
The tubing is ground on both the ID and OD. A keyway is broached on the ID the entire length of the part, approximately 2⅝ inches. Another keyway is then milled on the OD.

Since Eaton must work to very close tolerances on the part, concentricity of the OD and ID of the tubing are most important to minimize machining.

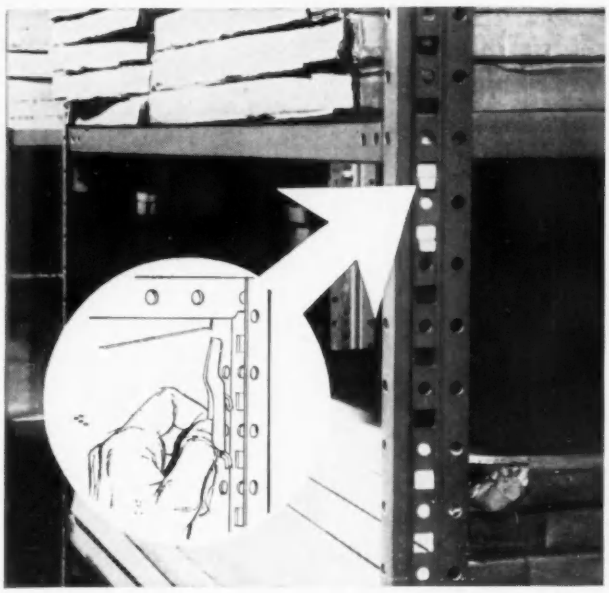
In addition, as it is part of a hydraulic system, the steel must be structurally sound without flaws of any sort.

This is another example of how precision fabricated Republic ELECTRUNITE provides high quality and cost savings for critical applications.

ELECTRUNITE is available in a wide range of sizes, gages, and wall thicknesses in both carbon and stainless steels to meet your needs. For full information call your Republic representative or send coupon below.



NEW ANNEALING FURNACES provide maximum heat treating capacity for cold extrusion steel. Quality of steel produced at the Chicago Bar Mill attains a high level of uniformity through heat treatment in two new atmosphere-controlled annealing furnaces. These new furnaces provide the capacity to assure prompt delivery of orders for heat treated steels.



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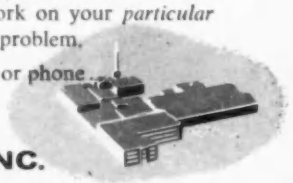

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The patented adjustable action of Moeller's Snap-Tite® and Turn-Tite® cam and lever type action closures makes it possible to design a low-cost stopper in virtually any size or shape.

Made of cold-rolled or stainless steel and high-grade neoprene, or other specified materials, these new closures offer many opportunities to cut costs in product design, labor, time and assembly. For additional information, write . . . Industrial Division, Dept. 28

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Dimensional accuracy and closely controlled mechanical properties insure consistency—consistently low machining losses, uniform strength, low fabrication costs and high torsion resistance—and the tubing is smooth inside and outside.

Whether your tubing application requires the dependability for a load-carrying member or the surface smoothness quality for a hydraulic cylinder, USS National Electric Welded Mechanical Tubing must be your first consideration.

USS National Electric Welded Mechanical Steel Tubing is available in a wide range of cold drawn or hot rolled sizes from as small as 3/8″ x .028″ to as large as 5½″ x .250″. Your National Tube Distributors throughout the country will gladly show you how tubing can reduce your costs. See your USS National Tube Distributor.

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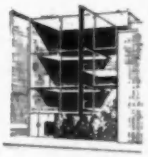
A CHILTON  PUBLICATION

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By C. J. Kelly
ASSISTANT EDITOR

Drill Catalog 1

High-speed steel and carbide drills are illustrated and described in a new 48-page catalog. Reamers, end mills, counterbores, tool bits and cut-off blades are included. ***Besly-Welles Corp.***

Specifications 2

Sixteen page engineering specification bulletin contains complete information on two Model St-A9AB Indexing Units—a Basic Unit and a Precision Unit. It contains information on available indexing cams and dial plates—on machine bases, motors and electric timers. A comprehensive load rating table and load calculation methods are included as well as a monogram for "Weight and Moment of Inertia" calculations and a torque rating table. *Standard Tool & Mfg. Co.*

Copper Rod 3

A new bulletin on beryllium copper rod covering three different alloys has been released. Included in bulletin R-1200-A, is data on tensile strngth, yield strength, elongation, Rockwell hardness and electrical conductivity for Beryloo 10, 25, and 50 alloys. Other properties such as modulus of elasticity, coefficient of thermal expansion, density and endurance strength of the versatile alloy are also listed. In addition, nominal composition, specifications for ordering, and tables for the selection of the proper alloy are included in the eight-page catalog. *The Beryllium Corp.*

Check List 4

A new six page brochure describing their diversified line of metal finishing processes, plating chemicals, and equipment has been published by *Enthone, Inc., Sub. of American Smelting & Refining Co.*

Reinforced Plastic 5

Tayloron PA-6, an asbestos-base laminated plastic which features excellent thermal insulation and ablation properties, is described in a new bulletin. Forms in which Tayloron PA-6 is supplied are listed in the bulletin as laminated sheet, molded rod, molded and rolled tube, molded shapes and molding material in compound form. Molding materials include sheets, rolls, cut squares and compound. *Taylor Fibre Co.*

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Chemicals 6

A condensed listing of the more important processing chemicals available has been published. The four-page bulletin lists the broad general categories of products and shows the chemicals and types available in each. Also included are descriptions of chemical class and uses for each. Categories included are surfactants, hydrosulfites and sulfoxylates, defoamers, resin and wax emulsions, water-soluble lubricants, water-soluble resins, softeners, and gas-fading inhibitors. Also listed are anzymes, metallic soaps, stabilizers, and inorganic compounds. *Nopco Chemical Co.*

Recorders 7

Strain Recording with Brush Direct Writing Recorders is the name of a new 20 page booklet. It discusses the application of strain gages and strain gage based transducers for accurately recording strain, tension, thrust, load, torque, etc. *Brush Instruments, Div. of Clevite Corp.*

Post Insulators 8

Bulletin TIA-184, four pages, describes the construction and features of two complete new lines of stacking station post insulators rated from 550 to 1470 Kv. Publication gives detailed information on the unique metal-polymer seal, and includes photographs, line and cutaway drawings, and a table of characteristics of the Company's standard, high strength and extra high strength insulators. *General Electric Co.*

Transmitter 9

Described in bulletin 13-17C is the type 12A pneumatic temperature transmitter. Features of transmitter design are emphasized: compact construction; force-balance operation; and — to sustain measurement accuracy—automatic compensation for ambient temperature and pressure changes. The 12-page bulletin illustrates how easily the transmitter can be installed and adjusted to suit a wide range of application requirements. Also included are detailed specifications, descriptions of operating principle, table of temperature ranges, and data on related accessories. *The Foxboro Co.*

Milling Cutters 10

An expanded line of milling cutters is thoroughly covered in two new catalogs. Detailed drawings and charts provide data on each cutter series, including sizes available, complete specifications and ordering information. *Vascoloy-Ramet Corp.*

Profilometers 11

A new 12 page general catalog covers the complete standard line of Profilometer instrumentation for the measurement and control of surface roughness. Detailed descriptions and specifications together with over 37 halftone reproductions make this catalog an ideal reference guide and order book for inspectors, engineers, quality control people and purchasing agents. *Micrometrical Mfg. Co.*

Pattern Services 12

Patternmaking services for sand and investment casting, and for production of components in fiber glass, are described in a new folder. The 4-page publication outlines the scope of the pattern services available both to Alloy's casting customers and to any other plants that need such production aids. Some of the services included are design consultation between pattern shop and foundry superintendents, storage of pattern equipment, and the construction of models, trim fixtures and jigs for molding in fiber glass. *Alloy Steel Casting Co.*

Cooler 13

The Roto-Fin heat exchanger, designed for high-volume cooling or heating of bulk materials, is described in a six page Folder 2911. Diagrams and photographs illustrate the simple, compact design of the Roto-Fin, which is a rotating drum with a series of flat, dual-purpose hollow fins or "cells" lapped consecutively around the inside of the drum to form an Archimedes spiral. Typical applications outlined or illustrated in Folder 2911 include: flue dust, finished cement, gypsum plaster, foundry sand, sugar, copper concentrates, sewage sludge, fluid coke and salt. Also shown is a laboratory-size Roto-Fin which is available for in-plant testing of any materials. *Link-Belt Co.*

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Flow Measurement 14

How measurement and control of flow rates in pipe sizes as high as 48 inches can be done economically is described in a new, factual, By-Pass Rotameter bulletin 116. The bulletin has been prepared especially for engineers and designers who want complete information about capacity determination, flow range data, piping requirements, accuracy and other important engineering details concerning the use of rotameters in by-pass arrangement. *Brooks Instrument Co.*

Air Press 15

New Bulletin 0960-B1 gives complete dimensioning and technical information for all open gap and column Hannifin air presses in both bench and floor mounting models. 34 press sizes are offered in a broad choice of capacities from as little as ½ ton to 50 ton force at 80 psi. *Hannifin Co.*

Ceramic Structure 16

A new brochure on Cercor, a thin-walled cellular ceramic structure developed for varied high-temperature uses, has been issued. The six-page bulletin details product properties and provides information on several applications: in heat exchangers, gas-fired infrared burners, entrainment separation, and as a catalyst support. Liberal use is made of charts, graphs and photographs. The bulletin also contains useful conversion values. *New Products Div., Corning Glass Works.*

Drilling Units 17

Technical information, specifications, drill thrust charts, tapping-threading data, typical circuits and applications are incorporated in a new 32-page catalog which covers high speed drilling and tapping units. *Hypneumat, Inc.*

Cutters 18

A completely new catalog covers an entire line of end mill and die sinking cutters. Entitled "T-J End Mill and Die Sinking Cutters," it is known as catalog 661 and contains informative data and numerical charts to aid the metal working engineer on his cutting problems. *The Tomkins-Johnson Co.*

Expansion Fit 19

A new bulletin discusses expansion fitting, as a time saving, reliable assembly procedure. The twelve page booklet contains a full case history, along with photographs illustrating expansion fitting bearing raceways, and it includes tables of expansion coefficients and nomograms for calculating rates of thermal expansion and determining the temperatures required. *Cincinnati Sub-Zero Products.*

Program Controllers 20

A four-page specification sheet describes a line of cam-operated program controller-recorders, which control process programs cut into plastic cams and record them on circular charts. Various types of pneumatic, electric contact, or electric proportional control are available. *Minneapolis-Honeywell Regulator Co.*

Drill Sets 21

New folder covers high speed steel drill sets for general purpose industrial applications. Included are brief descriptions of ten convenient drill sets ranging from the pack of 5 Triple-Duty ¼ in. shank drills to the Ace "Wirepak" set of 60 drills in wire gauge sizes from 1 through 60. Specifications are shank drills, 12 and 18 in. longboys also given on the Ace line of ½ in. as well as carbide-tipped masonry drills. *Ace Drill Corp.*

Thermocouples 22

A newly revised 40-page illustrated catalog provides specifications and a new price schedule for a complete line of general-purpose and special-use thermocouple assemblies and the components thereof. Some new materials are included, and detailed application information is offered. *Minneapolis-Honeywell Regulator Co.*

Lift Truck Series 23

Eight new models in the "Monarch" Series of heavy duty fork lift trucks are described in a 24-page catalog. Load capacities from 10,000 to 24,000 pounds are provided by the new series which includes units powered by gasoline, LP-gas, or diesel engines, and available in wheelbases from 86 to 120 inches. *Towmotor Corp.*

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Cutting Tools 24

To help distributors and users of Brown & Sharpe cutting tools, The Cutting Tool Division has just published a 4-page guide to all literature available. Some thirty brochures, booklets, catalogs and reprints are described in the new folder. A reply card is enclosed to facilitate ordering one or more copies of literature desired. *Brown & Sharpe Mfg. Co.*

Oil Filters 25

Bulletin I & M-5111 describes new OFM Series oil filters for use in mobile, industrial, and marine and ordnance hydraulics systems. The four-page bulletin includes photographs, a cross-section drawing showing flow paths, typical application circuits and pressure drop curves. A visual comparison is given of single stage filter paper versus the Vickers two-stage filter media. *Vickers, Inc.*

Safety Catalog 26

A new illustrated 20-page catalog (N-177) called "Personal Protective Equipment for Welding and Cutting" is available. There are 68 photographs and drawings featuring helmets, hand shields, goggles, safety glasses, safety hats and caps, face shields, portable screens, gloves and mittens, and accessories. *NCG Div., Chemetron Corp.*

Air Pumps 27

New 16-page illustrated, descriptive price list 61261 gives latest prices on complete line of Leiman rotary vacuum pumps, pressure pumps, gas boosters and accessories. *Leiman Bros., Inc.*

Noise Control 28

A new brochure discusses various products that have been and can be manufactured to control vibration, shock and noise. The publication presents a quick run-down of the company's history, facilities and experience. There are photographs of both personnel and products shown in the 15 page booklet. *Lord Mfg. Co.*

Lease Plan

A new brochure, outlining the details of a new Open Line Lease Plan for extra-long terms, has just been published. The brochure contains charts showing leasing costs from three to 12 years. Also included in the brochure is an explanation of which companies qualify for 3 to 7 year leases and which qualify for 8 to 12 year leases. Full explanation of the features of the Open Line Lease is included. Executives may obtain free copies of the Open Line Lease Plan brochure by writing on their letterhead to *Nationwide Leasing Co., 11 South LaSalle Street, Chicago 3, Ill.*

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